TECHNOLOGY DEPARTMENT

First Copy

THE MOTOR AGE

THE AUTOMOBILE AUTHORITY.

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There Are 600

MAKERS OF AUTOMOBILES, PARTS AND ACCESSORIES

Who have filed details of their productions for the Automobile Directory—

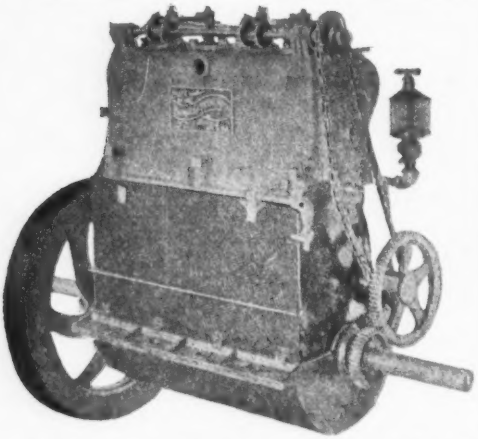
Are You One?

The Directory will be published about the end of January.

THE MOTOR AGE,

Monon Building, - - CHICAGO, ILL.

..SILVER MEDAL..



HIGHEST AWARD FOR ITS CLASS

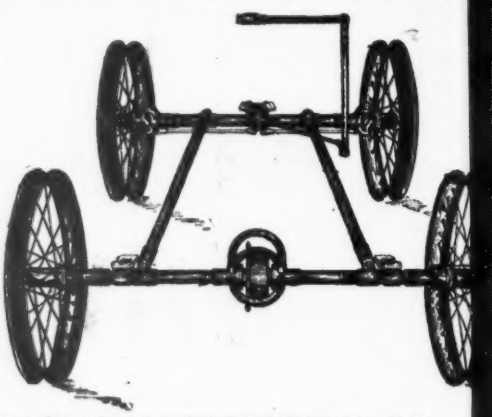
PAN-AMERICAN EXPOSITION

—TO—

Buffalo Gasoline Motor Co.,

10 to 20 Dewitt St., Buffalo, N. Y.

Manufacturers of Vehicle and Marine Motors and Gearless Transmissions, also Auto Accessories.



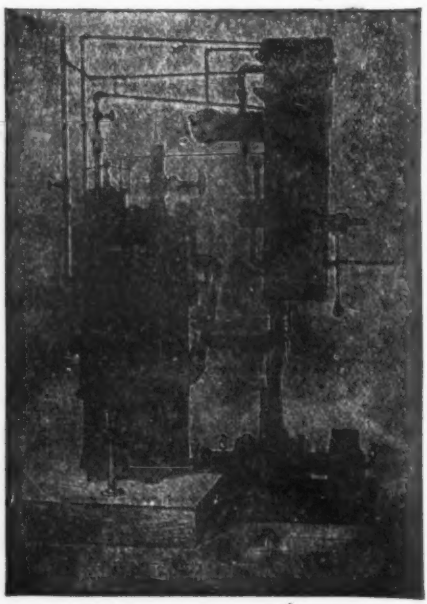
NEUSTADT-PERRY CO.

ST. LOUIS.

Manufacturers for the trade of all kinds of

AUTOMOBILE PARTS
BOILERS
ENGINES
BURNERS
FITTINGS

AND ALL KINDS OF STEAM GOODS.



THE Garland

AUTOMATIC GAS GENERATING APPARATUS

FOR AUTOMOBILE FACTORIES

Any Capacity
Great or Small

In use in steam laundries with small requirements and packing houses using 300 gallons of gasoline daily.

Gas of required density without use of supplimentary air blast.
No condensation.
Vaporizes every particle of oil.

We shall be pleased to figure on the requirements of automobile manufacturers.

GEO. D. GARLAND, - 43 S. Clinton St., - CHICAGO, ILL.

A List of Headings to be Used in the Motor Age

Automobile Directory

Makers Who Have Not Sent Details are Requested to Mark the Items They Manufacture and Send at Once to Motor Age, Monon Building, Chicago.

Automobiles, freight:
Automobiles, light delivery:
Automobiles, electric:
Automobiles, steam:
Automobiles, gasoline:
Ammeters and voltmeters:
Alarms, low water:
Asbestos cement:
Accumulators:
Axles:
Burners, kerosene:
Burners, gasoline:
Brakes:
Bodies:
Boilers:
Batteries, storage:
Batteries, dry:
Bearings, ball:
Bearings, plain:
Bearings, roller:
Bearings, ball thrust:
Balls, steel:
Bicycles, motor:
Bells:
Backs:
Binding posts:
Brazing compound:
Bolts and screws:
Coils, spark:
Cement:
Carbureters, other than surface:
Carbureters, surface:
Crank cases:
Cranks:
Charging outfits.
Controllers, electric:
Condensers:
Converters:
Chemical heaters:
Castings, aluminum:
Castings, bronze:
Castings, iron:
Castings, brass:
Castings, steel:
Clothing:
Cushions:
Cylinder oilers:
Color and enamel:
Coaster brakes:
Charging outfits, electric:
Case hardening material:
Chains:
Dashes:
Drive gates, automatic:
Engines, gasoline:
Engines, steam:
Engines, kerosene:
Frames:
Fenders:
Forgings, drop:
Forgings, rolled:
Frames, motor bicycle:
Fringes:
Glasses, water:
Glasses, gauge:
Gears, steering:
Gears, differential:
Gears, transmission:
Gears, running:
Gears, bevel:
Gear wheels:
Grease:
Grips, for steering bars:
Goggles:
Gauntlets:
Generators, gasoline:
Grease cups:
Gradometers:
Gearing, spiral:
Gauge cocks:
Gauges, gasoline:
Gauges, steam:
Graphite:
Heaters, feed water:
Horns:
Hydrometers:
Hubs:
Handles, steering:
Igniters, dynamo:
Injectors:
Indicators, for gasoline tanks:
Jacks, lifting:
Joints, flexible:
Lamps, oil:
Lamps, acetylene:
Lamps, gasoline:
Lamps, electric:
Lamps, water gauge:
Lubricants:
Lace, carriage:
Locks:
Leather substitutes:
Leather cloths:
Matting, rubber:
Mufflers:
Motors, cycle:
Motors, electric:
Mirrors, for steam carriages:
Machinery and tools:
Mud guards:
Nipples:
Name plates:
Odometers:
Oil, cylinder:
Oil cans:
Oil, lubricating:
Oilers:
Oil cups:
Oil hole covers:
Plug switches:
Plugs, spark:
Pinions:
Pilot lights:
Pipe joint compound:
Panels:
Pet cocks:
Pumps, water feed, power.
Pumps, water, auxiliary:
Pumps, air:
Pumps, air and water, power:
Pumps, water, hand:
Pumps, oil:
Packing, rubber:
Plugs, fusible:
Quadricycles, motor:
Radiators:
Rims, wood:
Rims, steel:
Rivets, tubular:
Robes:
Regulators, water level:
Regulators, gasoline:
Spring belt tighteners:
Sprockets:
Spokes, wood:
Spokes, steel:
Spokes, tubular:
Stampings, sheet metal:
Seats:
Speedometers:
Screws, nuts, etc.:
Springs:
Springs, for motors:
Seats, attachable:
Spark plug porcelains:
Steering knuckles:
Steps:
Tools:
Tool cases, leather:
Tandems, motor:
Trimmings:
Tires, pneumatic:
Tires, mechanical:
Tires, solid:
Tire covers:
Tanks, air:
Tanks, gasoline:
Tanks, water:
Tricycles, motor:
Tops:
Tank fillers:
Tire repair tools:
Try cocks:
Tubes and shells, seamless:
Tubing, steel:
Tubes, boiler:
Top levers and springs:
Torch heaters:
Threads, silk and trimmings:
Valves, miscellaneous:
Varnish:
Valve stem eyelets:
Valves, tire:
Valves, throttle:
Valves, safety:
Wrenches:
Whipcords, twine, etc.:
Washers and bushings, mica:
Wheels, motor:
Wheels, tubular:
Wheels, wood:
Wheels, wire:

Name _____

Address _____

A Fluke

May cause a motor vehicle to make a good showing on a single occasion, but when an automobile stands up and wins five days in succession, it most certainly demonstrates the absence of accidental victory. And when four vehicles stand up and win five days in succession, covering each nearly one hundred miles in a day and being awarded the highest honors at the finish, the charge cannot be supported, in the minds of reasonable men, that the triumph was not brought about by intrinsic merit.

Four first awards were given four WHITE steam carriages for their work in the New York to Buffalo Endurance Contest, promoted by the Automobile Club of America, whose official report can be secured from us, free of charge, upon request. Get a copy and draw your own conclusions from its recitals.

White Sewing Machine Co.

(Auto Dept.) **CLEVELAND, OHIO.**

...NOTE...

There will be a special exhibit of White steam carriages at the New York branch office of the White Sewing Machine Co., 22 Union Square, where all interested parties are cordially invited to call and inspect the vehicles.

...BRANCHES...

22 Union Square, New York, N.Y. 589 Tremont St., Boston, Mass. 212 Woodward Ave, Detroit, Mich
300 Post Street, San Francisco, Cal. 609 Main Street, Buffalo, N. Y.

CURRENT NOTES AND COMMENTS

Before the end of the year a formal transfer of the business of the Searchmont Motor Co. will be made to the Fournier-Searchmont Automobile Co., the two million dollar corporation formed to make automobiles on plans of Fournier's, doubtless with a Searchmont flavor. The officers of the new company have made no public statement as to their plans, but it is understood that they will make vehicles of all kinds, will occupy a factory of far greater dimensions than the present one and will endeavor to make about 1,200 vehicles a year.

Gabriel Blum, one of the directors, made the following statement about the company's plan to furnish a "hurry up wagon," for the use of people needing repairs:

"Our hospital for automobiles will give Philadelphia a great advantage over every other city in the country. Should an accident of any kind happen to a machine of ours at any point in the city, all that the chauffeur has to do is to call up the hospital, and an emergency auto will be sent to him. If the break is slight it will be repaired on the spot, but if serious the broken vehicle will be taken in tow and the passengers or goods taken to their destination.

"Another thing that is bound to happen and is even now talked of is the changing of large stables now used for horses into accommodations for motor vehicles."

When C. H. Graham, president of the old Seachmont company, was seen he said:

"Regarding the presidency it is a bit early to talk, but I have heard Foxhall Keene's name mentioned in that connection."

American Operators, European Machines

The announcement has been made that Mr. Bostwick, who has done so much to promote interest in racing in this country, will take part in the great race from Paris to Vienna next summer. He will be the third American competitor, the others being Vanderbilt and Keene, but it is to be regretted that none of them will use an American machine. The rules of the race limit the weight of competing vehicles to 2,200 pounds. Bostwick's Winton weighs 2,800 and will have to be discarded for that reason. The presence of three American competitors, all known to be possessed of ample means to buy the best thing there is on wheels, and all operating European vehicles, will prove something of a blow to the American industry among those people in Europe who might have been disposed to favor the machines made in this country. Bostwick has ordered a Panhard. It would reflect credit on the industry of this country if arrangements could be made for the participation of at least one American vehicle, and especially would this be the case if it should make a satisfactory showing in the race.

A Fire and a Quick Recovery

On the 19th the Diamond Rubber Co. felt called upon to address a circular letter to the trade relative to the disastrous fire which occurred at its New York house on the evening of the previous day. Temporarily it will be necessary to send repair work to one of the other eastern branches, at 234 Congress street, Boston, 435 North Broad street, Philadelphia, or 9 West Seneca street, Buffalo. It developed, later, that the machinery and equipment had not been as seriously damaged as was at first feared and within 10 days from the date of the conflagration the company promises to be in position to take care of repairs at New York as if nothing had happened. This is a sample of the cases which afford hustling concerns an opportunity to show what they are made of. People who are familiar with the movements of the Diamond company and know what it has accomplished in a short time will not doubt its ability to recover promptly from the catastrophe. Others may rest assured that the promises made will be fulfilled. The company's present New York address is 15 Warren street.

A. C. A. Standing Committees

The standing committees of the Automobile Club of America have been announced.

Several names which have heretofore been prominent in the club's affairs are missing, and this applies particularly to the technical committee. It has been insinuated more than once that the old committee had too strong a trade flavor, which doubtless accounts for the change. The name of George R. Bidwell appears on the committee on highway improvement. Mr. Bidwell was once president of the League of American Wheelmen, is in touch with people who know all about the subject, and if given a chance will be a very useful man. He has been collector of the port of New York and therefore enjoys close relations with other people who can be made of great service. The committees are as follows:

Technical: Dr. Schuyler Skaats Wheeler, chairman; Peter Cooper Hewitt, Lewis Nixon, Louis Duncan, L. T. Gibbs, E. T. Birdsall, A. L. Riker, Prof. Elihu Thomson.

Runs and tours: Jefferson Seligman, chairman; George B. Adams, Frank Eveland, John Aspinwall, J. C. McCoy, Percy Owen.

House: J. M. Hill, chairman; William Iselin, Bradford B. McGregor; Samuel H. Valentine, Henry K. Browning.

Library: Albert R. Shattuck, chairman; James L. Van Alen, T. C. Martin.

Membership: Gen. George Moore Smith, chairman; Juan M. Ceballos, Sidney Dillon Ripley.

Laws and ordinances: George F. Chamberlin, chairman; Judge James C. Church, Dave H. Morris, Henry Rogers Winthrop, William W. Niles, Morris Putnam Stevens.

Sign post: A Ward Chamberlin, chairman; George B. Adams, Frank Eveland.

Good roads: Albert R. Shattuck, chairman; George R. Bidwell.

Foreign relations: J. Dunbar Wright, chairman; Clarence Gray Dinsmore, Hart O. Berg, Eugene Higgins.

Racing: Albert C. Bostwick, chairman; Dave H. Morris, Clifford Brokaw, William Henry Hall, George Isham Scott.

Auditing: George W. Young, chairman; W. M. Van Norden, W. McMaster Mills.

Gasoline Motors on Railroads

There is in Chicago a company making gasoline motors designed to be attached to street cars. It has conducted its affairs quietly, so that little has been heard of it in the trade, but it is understood to be well backed financially. It is altogether probable that the gasoline motor will be used for the propulsion of many vehicles which run on rails, before long. Some time ago MOTOR AGE described a car designed to be used on an Austrian railroad. At home we have the humble hand-car, so built over as to save the operators the donkey work which was formerly necessary.

The Burlington has a gasoline motor car which is used by members of the superintendent's department of the Kansas City, St. Joseph & Council Bluffs division of the system in making inspections over the road. In a short time that it has been in use from 500 to 600 miles have been traveled in the car. The car has been over the entire division, which embraces a trackage of 312 miles.

The car is on the order of a railroad hand velocipede and has seats for three persons. On one side there are two wheels and on the other one wheel. The car is used on inspection trips to examine bridges and trackage where repairs have been made and also inspecting fences along the right of way. Often it is necessary to consult farmers in regard to fences. Then the car can be lifted from the track and the conference held, after which the motor is again loaded onto the rails and the occupants whizzed away at the rate of 30 miles an hour. This speed has been made more than once by men connected with the department. The car weighs about 300 pounds and can be easily put on and removed from the rails by one man, being so arranged that it can be pushed about on one wheel by lifting up one end. A gallon of gasoline will ordinarily run the car over 75 miles. Provision is made for carrying 4 gallons with the car, or sufficient to run about 300 miles. The operator sits in the rear of the car and if there are other occupants two passengers can sit on the front seat.

Fail to Profit by Experience

In a recent article Fournier expresses the opinion that American makers were mistaken in attempting to develop machines of their own design instead of copying those which had already been developed in Europe. They fell into mistakes which had been made by European makers, from whose experience Americans might have benefited. The same remark applies to people who

enter the trade today without knowledge of what has been accomplished by others. Men are spending thousands of dollars annually to find out what might be told them by scores of people, if they would take the time and trouble to ask. This is especially true of devices in which gasoline is a factor.

New Corporations and Enterprises

The Jewett Motor Carriage Co., of Jewett, Harrison county, O., has been incorporated with $25,000 capital stock by S. F. Switzer, O. A. Schweitzer, A. G. Messe, Burton S. Moore and F. B. Schlafly.

The New York Kerosene Oil Automobile Co., to manufacture automobiles to be operated with kerosene oil, and the New York Oil Industrial Engine Co., to manufacture engines to use the same fuel, have been incorporated, each with a capital of $50,000, to operate in New York.

The engine company later increased its capital to $500,000. The directoros of both corporations are Abbott A. Low, of Horseshoe, St. Lawrence county, and Fleador Hirsch and James W. Eaton, of New York.

Shrewsbury (Mass.) Motor Works, authorized capitalization $25,000; New Jersey agent, Clarence C. Smock, Fair Haven.

The Automobile & Cycle Co., organized at Kittery, Me., with a capital stock of $10,000, of which nothing is paid in.

Automobile Exports

Washington, D. C., Dec. 20.—The figures showing the exports of automobiles for the week just ended from the port of New York are as follows:

Argentine Republic—One package motor vehicles, $64.

Bradford—Sixty-nine packages motor trucks, $4,700.

British West Indies—One package machinery, $47.

London—Eight packages motor vehicles, $4,951.

Rotterdam—One package motor vehicles, $50.

Storage Battery Litigation

Judge Coxe has rendered a decision in the case of the Electric Storage Battery Co. against the American Bicycle Co., National Battery Co. and others in which the plaintiff asked for an injunction restraining the defendants from making batteries which infringe a patent granted to Charles F. Brush, on March 2, 1886, and numbered 337,299. The court holds the defendants guilty of infringement and concludes the decision in this language: "The court has not lost sight of the defendant's plea to be permitted to give a bond, but whatever argument is made upon the so-called 'equities' of the situation is met and answered by the single proposition that the complainant is right and the defendants are wrong—knowingly and deliberately wrong. It is thought that a construction of all the claims involved is unnecessary and unwise upon a motion for an injunction. An order restraining the infringement of the first three claims will answer every purpose, and such an order may be entered."

A Miniature Electric

New York, Dec. 22.—Mrs. George Jay Gould's Christmas present to her 9-year-old boy, George, jr., will be a miniature electric automobile. It was designed by J. O. McDonnell and built by Cole & Woop, 48-50 West 67th st., this city. It is complete in every particular.

Its dimensions are: Length over all, 4 feet; body, 3 ft. 3 in. by 1 ft. 7 in.; height, to seat, 2 ft.; weight, 200 lbs.; wire wheels, 20 in. rear, 16 in. front; tires, 1½ in. pneumatic; battery, 10 cells, developing ¼ horsepower; three speed lever, 5 to 7 miles an hour for 20 miles without recharging.

The Next New York Show

New York, Dec. 4.—(Special Telegram.)—At a meeting of the manufacturers' association held here yesterday a committee appointed to take care of arrangements for the next show in this city was instructed to make a contract with the management of Madison Square Garden for the last week in January, 1903. The association will offer the automobile club an equal share of the profits.

The French government makes an amusing display of red tape in connection with automobiles. The war department takes a census periodically of all horses and carriages. Orders have now been given for a similar census of horseless carriages, and the same veterinary commission is to exam-

ine both horses and motors, the war department evidently making no difference between horses and horse power.

A cablegram to the New York Herald from Paris says: This year's automobile show will be a greater pecuniary success than the last, which netted 50,000f. ($10,000). On Sunday 27,236 people passed the turnstiles, about 25,000 paying the entrance money. Between ten and twelve thousand persons have paid for entrance on the week days. On Monday there was a large attendance of prominent society people.

In the flowery days of the bicycle there was operated, at Worcester, Mass., a factory whose management knew more about expensive advertising than manufacturing. The company failed, owing the city $22,500 for taxes. The plant was sold last week to the city and is now open to bids from people seeking a location. It can probably be purchased at a bargain. The land is assessed at $118,900 and the buildings at $16,500.

The slaughter of antomobile records still goes on in France. On Tuesday, between Vernon and Gaillon, Gabriel, with a light Darracq machine, accomplished a flying kilometre in 39 1-5 s. against the old record by Collins of 39 4-5 s., Gabriel covered a flying mile in 1:03, against his own record of 1:06 1-5, and also lowered his own record for a standing mile of 1:19 1-5 by 6 seconds.

An international exhibition is to take place at Lille, France, from May to September, next year. Automobiles and cycles will be allotted a special building, which, it is promised, will be in a prominent location.

New York, Dec. 22.—Fournier did not sail for Europe on Wednesday, as he expected to, but has deferred his trip until January. He has been detained by business in connection with the recently organized Fournier-Searchmont company.

The Columbus Automobile Vehicle Co. has made a proposition to the Hilltop Improvement Association to operate a factory at the suburb controlled by it in consideration of $5,000 in cash and $5,000 worth of machinery. The officers of the company express the opinion that the plant will soon be as important as that of the famous Columbus Buggy Co.

It is announced that all is in readiness for the manufacture of gasoline vehicles at the factory of Thomas B. Jeffery & Co., at Kenosha, Wis., and that the season's output will be 500 vehicles. Mr. Jeffery has secured space at the Chicago show.

Max Cudell, of Germany, intends to make an automobile tour of the world. Leaving Paris in the spring he expects to go to Berlin and Moscow, through Siberia to Pekin, and home by way of San Francisco, Chicago and New York.

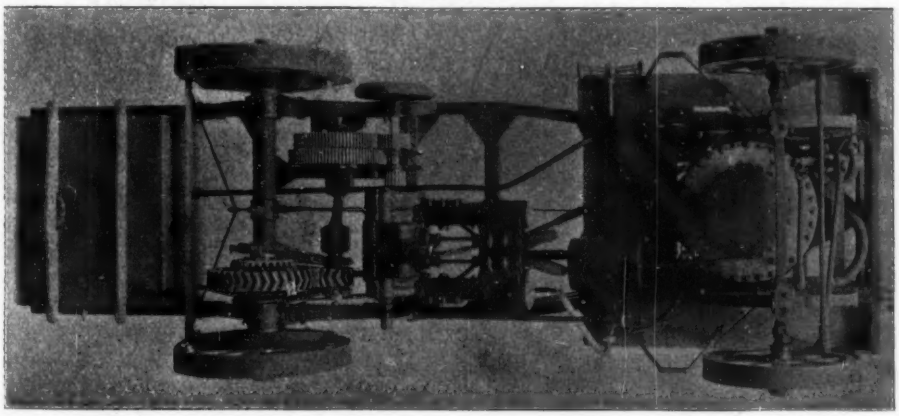
A standard form of guarantee will be adopted, guaranteeing delivery in good condition, first-class workmanship and the vehicle to be in operative condition when delivered. The 12 months' guarantee will be abandoned.

The Stable and Carriage Owners' Association, of San Francisco, has adopted a resolution of protest against allowing automobiles in the park and will present a copy of it to the commissioners.

The American Bicycle Co. has leased its Chicopee Falls plant, where Spalding bicycles were made, to the Stevens Arms & Tool Co., which will use it for the manufacture of firearms.

GREAT BRITAIN'S HEAVY MOTOR WAGONS

NUMBER FOUR.



VIEW OF THE UNDER SIDE OF THE THORNYCROFT.

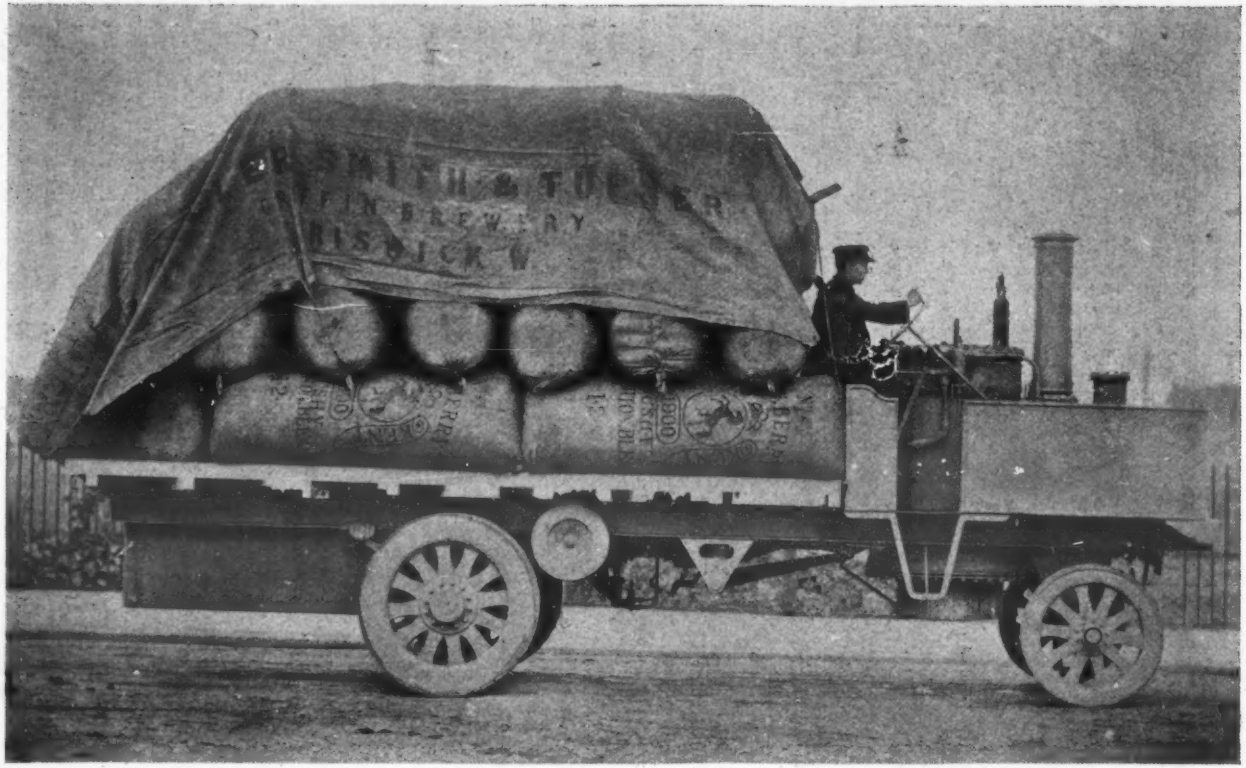
The Thornycroft 7-ton vehicle was the winner in class C. The conditions were: Minimum load, 5 tons; no limit to weight of vehicle; minimum level platform area, 95 square feet; minimum width of driving tires, 6 inches; speed, 5 miles per hour.

The frame of the Thornycroft, supposed to be the largest wagon ever built, is of channel section steel, strengthened with transverse members and gussets. The platform, which is fixed in place by a few easily removable bolts, is built up of oak and steel, and is provided for iron stancheons with connecting chains. The frame is supported upon the rear axle by semi-elliptic springs, and is carried above the front axle by a single transverse spring, which connects to the frame at its center and to the front axle at its ends. By a special arrangement of horn plates, absolute flexibility and a three-point suspension, coupled with strength and rigidity in the necessary planes, is ensured. The boiler is of the straight water tube type, with large heating surface and grate area. It is fixed to the framework just behind the front axle, and between it and the front of the wagon a centrally arranged funnel, K, and a combined feed heater and exhaust silencer, J, are placed.

The boiler is made entirely of steel, and is fired centrally, through a shoot on top. The cover of this, M, and an adjustable door, R, in the ash pan, serve for regulating the draught, the latter being controlled by a sliding rod in the floor on the left hand side of the driver. A spark arrester is fixed in the funnel. The driver's seat, N, is placed behind the boiler, and slightly to the right hand side of it. Plugs and a blow-off cock are fitted from the bottom of the boiler for cleaning out, and the fire can be clinkered through a special and easily accessible hole on the left hand side. The top of the boiler is removable for the cleaning of the inside of the tubes, and their outsides are arranged for being cleaned by a steam jet after taking down the side casing.

The throttle valve, Q, is fixed on the right hand side of the boiler, and is provided with a long spindle and a hand wheel, within easy reach of the driver. A safety valve, which is set to blow off at about 225 pounds to the square inch, forms a part of the same fitting. The pressure gauge, H, and a second safety valve, set to 250 pounds pressure, are placed on the top of the boiler, in front of the stoke hole. The water gauge, O, of the Reflex unbreakable pattern is fixed immediately behind the boiler, and an injector, P, which is so constructed that its cones can be removed while the boiler is under steam, is placed to the left hand side of the gauge.

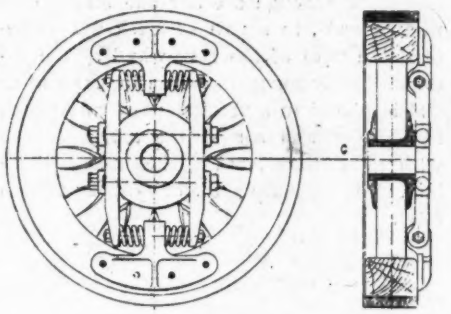
On the right hand side of the driver a reversing gear handle, S, is mounted with the



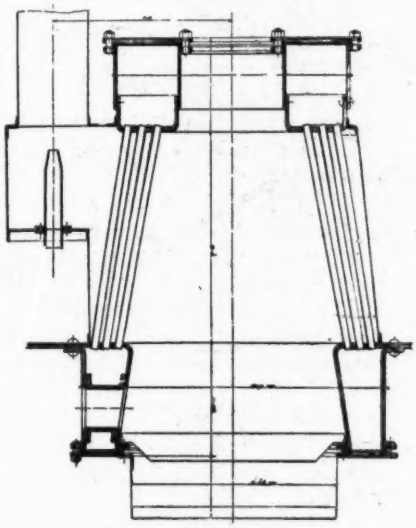
THORNYCROFT STEAM LORRY.

Winner of Gold Medal in Liverpool Trials, Class C.

usual quadrant, and this has two forward notches which correspond with cut-offs of ⅛ and ¼, besides the intermediate and reversed positions. A handle for regulating a by-pass on the delivery pipe from the



Thornycroft Spring Drive.



Section of Boiler.

force pump through the feed-heater to the boiler is arranged immediately beneath the driver's seat. The coke bunkers are on either side of the boiler and hold sufficient for a 50-mile run.

Four cocks to which steam can be admitted from a single cock on the boiler (near the throttle valve) are fixed to the bunker on the right hand side, and they serve for the distribution of steam to either of the four following parts: A water lifter, for filling the tanks, steam blast for accelerating the raising of steam, a by-pass for admitting live steam to the low pressure cylinder, a steam jet for cleaning the boiler tubes. Two water tanks are used, the larger one being placed beneath the frame at the back of the vehicle. The second one is arranged on a higher level and gives a head of water both to the pump and to the injector.

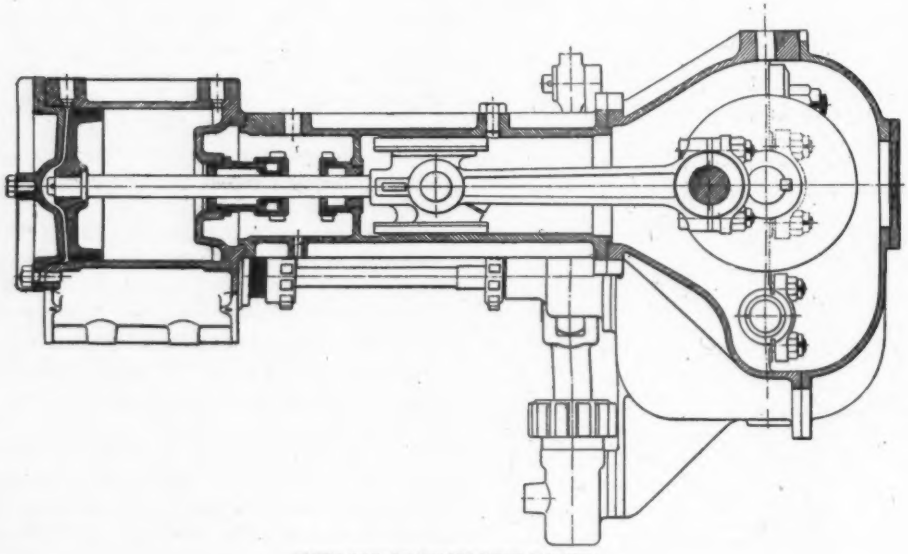
The engine, A, is of the two-cylinder compound type, having cylinders 4-inch and 7-inch in diameter by a 5-inch stroke. It is fixed horizontally beneath the frame-work, and is completely enclosed in an oil-tight case. The lubrication is on the splash principle, and the bearings are of large size, permitting of running at speeds of some 800 revolutions per minute, and developing as much as 35 horsepower. Piston valves, which are arranged underneath the cylinders, are operated by a specially designed radial valve gear, which is of the single eccentric type, gives a constant lead and permits of any degree of linking up. An outside fly-wheel, G, is fixed on the right hand end of the crank-shaft, B. The exhaust steam, after passing through the feed-heater, is taken into the smoke box and discharged invisibly from the funnel.

The transmission gear consists of two machine-cut pinions which ride upon a square part formed upon the right hand side of the engine-shaft, and either of which may be brought into engagement with corresponding spur wheels, C, on the countershaft. The countershaft is divided into three pieces, C, D and E, with special universal joints between them, and that portion which carries the spur wheels follows the motions of the engine and the frame. The intermediate part serves as a flexible coupling between the first part and a third part, and allows of the remainder of the transmission gear following the movements of the rear axle. Power is transmitted from the countershaft to the differential gear, F, on the axle by a pair of double helical cast-steel pinions. The portion, E, of the countershaft is carried in a pair of brackets, which are mounted about the rear axle, and are stayed by a link hinged to the underframe. This device has been given the name of the Thornycroft patent bell crank drive and it constitutes the chief feature of novelty in the transmission gear employed.

The rear wheels are driven from the differential gear, through flexible drives of much the same pattern as those hitherto used, but in this wagon the leaf springs

have been replaced by an arm carrying four helical springs in compression. The central member of the rear axle is carried through from end to end and on the left hand side of the wagon, where it passes through the sleeve, driving that road wheel, it carries a kind of band brake which normally rides freely about a drum, forming part of the rear wheel, This brake can be caused to grip the drum and in this way to lock the differential gear.

Steering is effected by a large hand wheel on front of the driver, which is mounted on an inclined shaft, and which operates the front wheels on the Ackermann principle, through the medium of a worm and sector; a lock of 42 degrees is obtained. A second hand wheel, L, on a vertical shaft is placed to the left hand side of the driver, and is connected, through a screw and strong connecting rods, to a pair of block brakes behind the tires of the rear wheels. The ordinary water pump is driven by the engine and is placed in a vertical position beneath it. The wheels are of the artillery type with metal naves, oak spokes and ash felloes. The tires are made of special weldless steel.



THE THORNYCROFT ENGIN .

FROM CORRESPONDENTS

Spokane, Wash., Dec. 18.—To the Editor: I understand there is some one who has a transmission gear for gasoline automobiles, so made that one lever will change the speed from comparatively nothing, up. Will you kindly inform me if there is such a transmission, and give me the name and address?—Yours, etc., C. L. Glenn.

The concerns referred to are the Friedman Automobile Co. and the Chicago Motor Vehicle Co., both of Chicago.—Ed.

Details of Motor Construction

Chicago, Dec. 15.—To the Editor: I desire to build a four cylinder, four cycle, gas engine, 3¼x3½ stroke, air cooled, maximum speed 1600, and desire the following information, if not too much trouble:

Cubic inches of explosion chamber.

Full area of exhaust valve necessary, and lift.

Full area of inlet valve necessary, and lift.

Diameter and weight of flywheel, one flywheel for four cylinders.

Diameter of crank shaft.

Thickness of metal in cylinder.

Is 3¼x3½ too large a cylinder for air cooled purposes in automobile work?

About what would be the maximum horsepower?—Yours, etc., George W. Hayden.

To take up the questions in order: To obtain the desired speed the compression should be at least five atmospheres and to assure that degree of compression the space should be 7 cubic inches. The diameter of the exhaust valve should be 1½ inches, with a lift of ½ inch. The diameter of the inlet valve should be 1⅝ inches, with a lift of 7-16 inch.

The diameter and weight of the fly wheel is a matter of question, as the timing would probably be so arranged that the four cycles of action take place during each stroke and the explosion in one cylinder act against the resistance to compression in another. Under these conditions the fly wheel is required merely to steady the running.

Owing to the necessary length of the crank shaft it would probably be advisable to make it not less than 1⅝ inches in diameter. The thickness of the cylinder walls should be approximately ¼ inch, which should be abundant for a cylinder reinforced with radial fins.

The nominal horsepower of an engine of the character described should, at 1600 revolutions per minute, be close to 9½. This is, of course, largely dependent on the workmanship and fit of the various parts and would be materially decreased in case of leakage at valves or piston rings.

As to the matter of air cooling, a single cylinder engine of the size stated might be satisfactorily cooled were it properly exposed to air currents, but the cooling of a multiple cylinder motor is a much more difficult matter and it is extremely doubtful if it could be accomplished in an engine of this size.—Ed.

Abuse of American Products

Brussels, Dec. 8.—To the Editor: I wrote you the other day in regard to the English shows and as I took with me quite a large number of catalogues I was also requested by several representatives of big firms to leave my name with them so that they may forward me, later on, other catalogues if they made any changes. I have already received two letters and one circular from these firms, Both English, and this enterprising action reminds me of what happened during the summer with regard to some of your manufacturers of automobiles, in which I will include the motor bicycles.

You will remember that I wrote you asking for catalogues and prices of motor bicycles. You referred me to several and while I received prices and descriptive matter from the Thomas people I also received a letter from a large commission house in New York, which represented the maker of a motor bicycle, in which was said, among other things, that "motor bicycles were yet in an experimental state, and that no one is yet making one which is really safe and upon which one can rely. We think that

it will be at least another year before a good motor bicycle will be on the market in this country which can be recommended. There are many working hard to get the right thing, but a motor bicycle is not a bicycle, and it will take more care and more science to construct one upon which one may ride without having to take a life insurance policy than for a bicycle."

Having written about the same time to a western mail order house which advertises extensively in American papers which I often read, I received the following reply:

"We do not yet handle automobiles for the simple reason that they are yet too expensive and at the same time insecure. There are many manufacturers of them, but none, in our opinion, has yet made anything on which one could ride 50 miles without having some kind of an accident. As soon as this kind of locomotion is more advanced and the prices more to the convenience of the middle class of people we will be handling them and can assure you that we will be able to quote you lower prices than most any one else."

It seems to me that while there may be some truths in these reports there is certainly a little exaggeration, as I see quite a number of American automobiles, mostly steam, here in Brussels, and also a number in Paris. The owners are some of the most fashionable of the aristocracy and it seems to me that if American automobiles were really in a state of experiment people of great means, like owners over here, would not buy them but rather take some of the well known French makes.—Yours, etc., A. T. M.

China Wants Motor Bicycles

Nanking, China, Nov. 7.—To the Editor: This is an inland place. Foreigners are few, and still fewer desire machines, as roads are bad. There has not any one yet ordered one, although several have looked at mine and are very pleased. I would suggest, however, to those who desire to bid for China trade, that this is not the place, as it is in the interior. Few natives have means to buy and there are no roads if they did. In our city we have a road some 8 miles long suitable for a spin. The country roads are simply foot paths, not kept up.

In Shanghai there are many foreigners and good roads. There are already three foreign salesrooms there, and perhaps more have started since last I was there. Low priced machines, yet good ones, and a good repair shop at moderate rates would succeed. Other ports where foreigners are would supply some trade. There is now in these ports a limited native trade, but no general trade in the interior and through the country that amounts to anything. Not even in this city of 500,000 inhabitants, and one of the most important cities in the whole of China, are there more than 100 foreigners. Shanghai is the great port and business center, but is located 200 miles southeast of here.

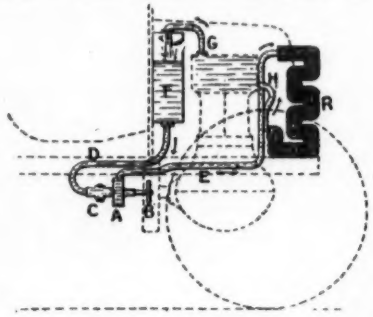
I wish to ask you about motor bicycles, either gasoline or electric. Are they in the market yet, and what would be the cost of one? Is there any for use on ordinary roads? I would like to know about a good, strong machine, cushion tires if obtainable, and a convenient motor to work on rough roads and up and down hill. Speed does not so much matter. Eight or 10 miles up hill would be more than needed. Would gasoline or electricity be best or cheapest, and which is the most practical and easily managed? Which the cheaper? I would be glad to hear from you.—Yours, etc.

The name of this correspondent is suppressed at his own request. Communications intended for him and addressed to Nanking, care of MOTOR AGE, will be forwarded with pleasure.—Ed.

THE NEW LIGHT PANHARD CARRIAGE

PART THREE. TRANSLATED FROM LA LOCOMOTION.

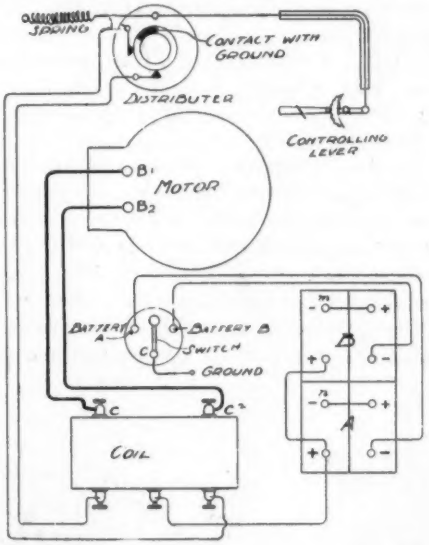
The ignition of the light Panhard is accomplished by means of hot tubes. The burner case has an opening, topped by a metallic plug, through which it is filled with oil. Underneath is a valve which regulates the quantity of liquid so that the burners may not receive more than will provide a blue flame. If the valve is too



wide open the flame will go out. To start the burners it is necessary to fill two little cups, under the burners, with alcohol, and fire them, just as it is done in starting a gasoline stove. As the level of the alcohol lowers and the flame abates the needle-valve is opened wide. The gas from the burners immediately ignites and gives a blue flame around the platinum tubes H. The lamp has a capacity of 2 liters, which feeds the burners 7 hours.

Electric ignition can also be used without interfering with the arrangement of the hot tuges. Two sets of storage batteries are placed outside of the carriage, above the right step. A double coil, with tremblers, is fixed to the dash, together with a double interrupter and a small lever on a toothed quadrant. On the extremity of the secondary shaft of the motor is mounted the distributing cam, which establishes the contact for one or the other cylinder. Either set of batteries will furnish the required energy so that one may be held in reserve. For throwing either set of batteries, as desired, into the circuit, a three-point switch is provided, to be moved to the points A or B as required. The connections of either set of batteries may be easily traced by the accompanying diagram. If we turn on the pivot C, the central handle of the interrupter, and place it on the contact stud, battery A, the primary current runs as follows: From the positive terminal of battery A to the center of the coil, through the induction spirals to the distributer, through the bronze piece which is part of the ground, back to the handle C, which also is a part of the ground. As the handle is pushed to A the current passes through the stud A and runs back to the battery through the negative terminal.

It will be seen that the battery B has not been in the circuit. If it is desired to make it work the handle of the interrupter is pushed to battery A. The current then starts from the positive terminal of this battery and passes through the binding post as a part of the circuit. When the current comes back through the ground to the interrupter, it passes, by way of post B, to the negative terminal of battery B. The secondary current is united, on one hand, to the ground by means of an internal arrangement of the coils and, on the other



hand, to the binding screws C and C2 and the sparking plugs B1 and B2 by means of two well insulated wires.

The ignition timer is constantly drawn

by a spiral spring in the direction giving the low speed. From the timing device a flexible wire passes through an L-shaped tube to the controllng lever and upon moving this lever in the proper direction the ignition is advanced against the resistance of the spring.

The cooling system is concentrated in front of the carriage. The tubes are, therefore, short and less liable to leaks and, above all, the cooling is made more certain for the water tank is situated in the full draft of the fore-part of the carriage. The tank F, of a capacity of 20 litres (18 quarts) is fixed in front of the dash. The water runs through D to the pump A, which is impelled by a friction wheel B, driven by contact with the fly-wheel of the motor. This pump sends the water through the pipe E to the upper part of the radiator R, where it is cooled and passes, by pipe H, to the inlet at the lower end of the water jacket, from which, through G, it returns to the tank. In C is found a three-way cock which allows the driver to establish the normal communication between the tank and the cylinders, to empty the entire system or one side thereof, as may be required.

Cheap Rates to Chicago

The latest information relative to the Chicago show arrangements is that the Central Passenger Association has granted a rate of a fare and a third, on the certificate plan, from all points in its territory. The points from which this rate will apply are shown by the white space on the accompanying diagram. Passengers will buy tickets at full rates on the way to Chicago and will ask the selling agent for a certificate stating that they have bought tickets to the Chicago show. This certificate will be presented to the association's agent, who will have an office at the Coliseum, who will certify that the holder has been in attendance. This certificate will enable the holder, after identifying himself as the original purchaser, to buy a ticket for the return journey at one-third of the regular fare. This rate applies to persons purchasing tickets for the journey to Chicago not more than three days before the opening nor more than two days after. The certificates will be good for the return journey within three days after the close of the show or at any time in the interval. The association requires that there shall be not less than 100 holders of these certificates. Holders will therefore present them to the agent as soon as they arrive at the Coliseum, so that the agent may know as early as possible that there are at least the required number in

attendance. He will sign no certificates until he is so satisfied.

The first of the weekly show bulletins went out on Saturday last. It showed that there were few spaces left and as a result four of those remaining were disposed of on Monday. Among the late additions are the Porter Battery Co., Buffalo Electric Carriage Co. and the Spaulding Automobile and Motor Co.

THE NATIONAL ASS'N AND THE A. C. A.

New York, Dec. 22.—To-morrow, at noon, the law committee of the A. C. A. will meet and prepare the final draft of the scheme of club affiliation to be presented to the governors' meeting later in the day for its approval before its promulgation to the thirty-seven "recognized" clubs, which have been invited to combine under the affiliation plan. Last Tuesday afternoon the governors met and discussed the question for several hours. Many amendments were made and ordered to be incorporated in the instrument. It was learned from President Shattuck and others present that despite the amendments the agreement still was based on the assumption that the A. C. A. is the national organization and that its contents were practically the embodiment of the scheme outlined in the letter of invitation.

* * *

Though President Shattuck and the governors upholding the national and parental idea seem to be in control of the board, your correspondent has not failed to unearth, from his quite extensive conversations with the members, a suspicion that the views of President Shattuck and his colleagues may not represent the unanimous opinion on the subject, and that when the matter comes to a head there will be found those who will agree with outsiders that the national assumption is untenable and that it is unreasonable to ask outside clubs and automobilists to accept laws from any parent organization without voting privileges. The A. C. A. is held in high esteem by the motor vehicle world at large for its many accomplishments for the weal of automobiling and its constant and continual efforts toward the good of the sport and the industry. Regret and astonishment are very generally expressed that the powers that be in their well deserved pride in the club should have gone so far in their assumptions as to endanger injurious antagonism to it from the outside.

* * *

The opponents of affiliation on the national and parental theory do not dispute the truth of President Shattuck's statements that over half of the clubs invited to join may have consented on the impulse of the moment to agree to such a scheme, but claim that since the plan has been thoughtfully discussed and the national and parental claim of the A. C. A. has been made apparent there has been a change of sentiment, which will ultimately result in a very general refusal to participate in affiliation on such a basis. These advocates of a national association of clubs claim that only the Syracuse, Bridgeport and North Jersey clubs, as far as known, have really consented to join in affiliation under present conditions. A prominent official of the Massachusetts Automobile Club is quoted as having remarked, "We do not want another Boston tea party. Massachusetts will stand for no legislation without representation."

* * *

The president told a MOTOR AGE man that he would not be willing to enter an association of clubs. "We do not think," he said, "that a club of fifteen members should have a vote equal in power to that of one like ours with over 300 members and possessing the prestige and influence of ours. (No one has ever suggested such an absurd plan.—Ed.) We do not believe that racing and automobiling generally could be as well controlled by an association as by a metropolitan body like ours. Our country is too large and the points are too distant for delegates to meet to settle all questions that might arise. All racing so far has been promoted under our auspices and we have had experience in such matters."

"But, Mr. Shattuck, is it not a fact that of your 350 members the fifty associates alone come from the country at large and that the 300 active members are residents of New York?"

"You will have to get the figures from Secretary Butler."

"Do not the memberships of the French and British clubs number several thousand each?"

"They have a much larger membership than ours, but Paris and London are convenient centers in small countries as compared with ours."

Your correspondent refrained from dis-

cussing this reply further or calling Mr. Shattuck's attention to his admission that this is the foundation of the argument against the case of the A. C. A. being parallel with those of the French and British clubs in relation to their countries.

"We are perfectly willing to give foreign racing credentials to all members of other clubs deserving of them," said Mr. Shattuck in conclusion.

* * *

The Long Island Automobile Club has taken formal action in favor of a national association and its members are outspoken against the position taken by certain A. C. A. officials. "Speaking for itself, the Long Island Automobile Club," said A. R. Pardington, one of its most active and influential governors, "agrees with the Chicago Automobile Club that the entire sport of automobiling should be controlled by a national organization, this organization to be, if you choose, a federation of clubs, the clubs entering into the federation to be represented by membership in such federation. The plan proposed by the A. C. A. is un-American in spirit. It is unfair to suppose that the A. C. A. can, in New York city, draft and promulgate racing or other rules for the control of the sport in far distant and remote quarters. Local conditions, which obtain at different points of the country, are best known and understood by representatives of those sections."

L. R. Adams, president of the L. I. A. C., was called up by telephone and said: "What if the A. C. A. is recognized by the foreign clubs? Does that make it the national organization of America? What right have the foreign clubs to determine for us which is our national body? We will settle that ourselves. We may never care to have them pass on the question at all. If we should desire their recognition I have no fear that it would be accorded a national association of clubs as soon as the situation was understood. Wealthy and influential members of the A. C. A. traveled abroad and had the advantage of getting close to the foreign powers that be. There being no other club to put in a claim, recognition was naturally easily obtained for the A. C. A. What has foreign recognition got to do with the question anyhow? We can settle our own affairs without their interference."

* * *

In a published interview on the question of a national association, Isaac D. Porter, former president of the L. A. W., declared that the ruin of the wheelmen's league had come largely through national control instead of local government and warned the automobilists against any form of control that took from any state or section the management of its own affairs.

A WESTERN VIEW OF THE CASE

The Automobile Club of America is a national association. It has the right to tell all ordinary mortals what they may and may not do. The president says so. And to prove it he shows credentials from the powers that be among European institutions.

* * *

But despite all that the stand taken by the Chicago club in the matter of the proposed affiliation for the control of the sport and other matters seems to have met with approval in many places. It is claimed and denied that a majority of the clubs to which the invitation was extended have accepted. Many have probably agreed without thought of the consequences, for in better informed quarters the plan has met with such opposition as to render it certain that if a move is made toward the formation of a national association it will receive support in both east and west.

The members of the Long Island club, as was related last week, are particularly outspoken in regard to the matter. As to Chicago, the club is simply waiting for a reply to its letter to President Shattuck, in which letter it extended an invitation to the New York club to call a meeting at the time of the Chicago show and offered to entertain the visiting delegates while in the city. No move will be made until the January meeting but something definite may be expected at that time.

* * *

From New York comes a story that the president of the New York club has not the undivided support of his own club members. The committee appointed to take care of the matter is still at work and there was to have been a meeting early this week to act upon the agreement which it is proposed to have the affiliating clubs sign. But it is

reported, nevertheless, that there are a great many members who will secretly rejoice at the refusal of other clubs to agree to the plan.

* * *

The Rochester club has decided to take no action in the matter until after the holidays. Joseph J. Mandery, one of the leading members, and formerly president of the club, was interviewed last week and expressed these sentiments:

"We have just heard of the plan to form an association of clubs and, of course, I can not say what action we shall take upon it. Personally, I am disposed to favor the Automobile Club of America, but although I am totally ignorant of the circumstances of this latest complication, I should think that something like the newer idea is what we want. It seems reasonable, to apply common sense, that an association composed of representatives of all the clubs of the country could better represent the sentiment and desire of the automobilists of America than an organization made up entirely of New Yorkers. The same scheme was tried with the bicyclists, when the wheelmen of a single city attempted to control the sport. I should say that the automobile people of the United States would be better pleased with a national organization."

* * *

Now let us hear the president of the New York club:

"We maintain," he says, "that we are a national organization, and as such should control racing. We are recognized as such by the foreign clubs, and we are empowered to pass upon the eligibility of all American entries to international contests. Outside of this we are the pioneer organization, and we have exercised national functions by securing the passage of laws for the good of automobiling, such as the gasoline on ferry-boat act.

"We promoted the great endurance run to Buffalo, and the race meets of the country have been run under our auspices. We are not willing to enter any association of clubs. We do not think a club of fifteen members should have a vote equal in power to that of a club of our membership and standing. We do not believe that racing and the sport generally could be as well controlled by an association as by a metropolitan body like ours.

"The British and the French automobile clubs have a much larger membership than ours, but London and Paris are the centers of those countries. We are perfectly willing to give foreign racing credentials to all members of other clubs deserving of them. A majority of the clubs invited to join in our affiliation scheme has already accepted."

* * *

The arguments of the president in support of his contention are unfounded. His club is not a national institution in any sense. No club with a prohibitive fee and with such restrictions surrounding its membership as to make admission without personal acquaintance with one of its directors impossible can be a national body. It is un-American to claim any such folly.

* * *

The securing of certain legislation relative to the ferry boats of New York had nothing to do with national functions. There were race meets in this country before the club was ever heard of, in the west, at least. Some of the race meets have been run under the sanction of the club, but this does not include those in this part of the country. The fact that the club is located in the metropolis does not give it national power or national importance. Its connection with foreign institutions is due simply to the fact that it was early in the field and not to any recognition of its control of the country at large. And in any event foreign people are not the ones to whom to apply for credentials as a national body.

The Chicago club may, or may not, decide to take the matter up with the Long Island and other clubs and call a meeting at the time of the Chicago show. But in any event the plan of affiliation and the recognition of the New York club as the ruler would be distasteful to many of its members and will meet with sturdy opposition.

Action Has Been Deferred

New York, Dec. 4.—(Special Telegram.)—President Shattuck has just told your correspondent that he will defer promulgation of the affiliation agreement until after a consultation with the club's new committee. This consultation will be held Thursday.

AMERICAN BICYCLE CO.'S PLANTS DIVIDED

Reorganization of the affairs of the American Bicycle Co. commenced last Friday with the incorporation of a couple of subsidiary companies, designed to divide the manufacture of cycles and automobiles, to give the company making each a distinctive and appropriate name, and to make the parent company that which the previous course of the company indicated it would soon become, the clearing house through which the dividends of a number of smaller concerns will eventually reach the stockholders.

The American Bicycle Co. owns the stock of at least two companies, aside from those just organized, and is the holder of a large share of the stock of a third. The facts concerning the new companies, as related by the New York representative of this paper, are as follows:

The American Cycle Manufacturing Co., with $8,000,000 capital, takes the place of the bicycle manufacturing department and the International Motor Car Co., with $2,000,000 capital, of the automobile department.

The directors of the two companies are identical and are now Joseph E. Bromley, R. Lindsay Coleman, George Pope, Theodore E. Merseles and Paul Walton. The last named is a resident of Jersey City.

Mr. Bromley became the president of the cycle company and Col. George Pope of the motor car concern.

"There is not much of a story in the change in the plan of administration," said the colonel. "We are merely engaged in incorporating our various departments for commercial convenience. The American Bicycle Co. remains the same as it was before and is owner or controller of the stock of its various component corporations. Their stock has simply been put in the treasury and is held as it was before. That is all."

The American Bicycle Co. will in future act as the security holding concern of the subsidiary corporations. The new organization follows the plan of the American Steel Corporation in acting merely as a central organization, receiving its income in the form of dividends on the stocks of the underlying companies.

Canadian Combine Criticized

The affairs of the Canada Cycle & Motor Co. are just now the subject of adverse comment among Canadian financiers. The earning power of its factories has somehow decreased in a remarkable way and people have insinuated that the directors have conspired to keep the shares at a high price until they could dispose of them, which statement, however, is quite unfounded. The affairs of the company, according to one of the financial papers, have been the talk of the street for nearly a week, and many and severe have been the comments upon the extraordinary statement laid before the annual meeting last week. The collapse in earning power is remarkable; for where in the prospectus of 1899 the earnings of five bicycle companies amalgamated showed an average profit of $267,000 for each of the three preceding years, the trading account for the company's year 1901 shows a profit of only $2,035. And the astonishing thing is that in the year which now shows instead of $200,000 profit only $2,000 the dividends paid amounted to $175,000. We have seen the books of the company, and find from them that the seven directors held on Nov. 1, 1901, $600,000 of stock. Two of them hold, in round numbers, $180,000 each, one $100,000, others $66,800, $14,000, $55,000 and $5,000. Only two have sold any of their stock. The present holdings of the directors amounted to more than $1,000,000 at the date of last week's meeting. Moreover one of the directors has stated that the directors and their friends paid for preferred stock on the same basis as the general public, and that several of the board as well as other shareholders were underwriters as well as subscribers for the shares. But what was done in 1899-1900 was to form syndicates among the directors and others to support the stock when for a time it

showed a decline, and in some cases more than par was paid for shares with this object in view.

Toronto Board of Trade

The Toronto Bicycle Board of Trade held its annual meeting on Friday night of last week. The board is composed of all the bicycle manufacturing and repair men of Toronto and has had a very successful year. The main object of the board is not to control the prices of bicycles but to make prices for repairs uniform throughout the city, not by raising prices but by leveling them down to a fair basis. The financial statement as presented by the secretary-treasurer, George E. Grove, was very satisfactory and a substantial balance was left over after paying all expenses for the year.

The officers for the ensuing year are as follows: Honorary president and chairman of the executive committee, S. Bulley, of the Planet Bicycle Works; president, A. R. Price, 1020 Queen west; vice-president, C. A. Ryerson, Ryerson & Might, 304 Queen west; secretary-treasurer, G. E. Grove, 362 Yonge street; executive committee, D. Lochrie, Antelope Bicycle Works; Alex. Kaye, Alex. Kaye Cycle Co.; H. E. Readman, 275 College street; A. E. Vey, 666 Queen west; R. Pettigrew, 73 Carlton street; A. E. Humphries, 364 Queen west; E. Birch, 1276 Queen west; C. Bradfield, of John Miller & Sons, 130 Bay street; auditors, Messrs. Humphries and Green.

American Cycles in France

Nearly everybody made some criticism when the American Bicycle Co. first made its appearance here about a year ago, says the Auto-Velo. Now that its second season is nearly finished we can easily determine its role from nearly every point of view, either in general or in detail. Among cyclists the opinion is unanimous that the American syndicate has improved business conditions, inasmuch as it has compelled makers, too anxious to become rapidly rich, to reduce their exaggerated prices and at the same time improve the quality of their output. At a time when the cycle industry was inclined to adhere to a single type without attempting to meet the growing demand for such refinements as free wheels, back pedaling brakes, etc., the perfected bicycles of the American company came on the market and obliged the French manufacturers to make improvements in their models which were plainly in evidence at the recent automobile and cycle show at Paris.

While the automobile industry was making such rapid advancement the cycle manufacturers were allowing their industry to retrograde to a condition of neglect, and were making anxious efforts to enter the automobile field. The A. B. C., however, had quite a different conception of the situation and immediately began an active campaign of advertising in the provincial districts, as well as in Paris, and renewed interest in the great road racing events by organizing teams comprising all the prominent European riders and entering them in the leading events. This induced a healthy condition of the cycle industry and we must congratulate the American syndicate on having shown a degree of enterprise to which we were unaccustomed.

By thus augmenting cycling enthusiasm and placing the price of a first-class machine within the means of the general public the entire trade has been benefited. The A. B. C. opened the way and home makers are following the lead. Owing to the fine roads and the activity of the French the cycling population of the country is as yet in but small proportion to what it might readily become, and it is to the credit of the American company that it is thus advancing the condition of the industry rather than inaugurating a warfare against the home makers.

We are thus in a position directly contrary to that predicted by a majority of the press in their railings against the competition of trusts and monopolies.

Bicycle Exports

Washington, D. C., Dec. 20.—The figures showing the exports of bicycles for the week just ended from the port of New York are as follows:

Antwerp—One package of sporting goods, $10; one package bicycles, $50; sixteen packages bicycle material, $927.

Amsterdam—Fifty-six packages bicycle material, $1,060; one crate, bicycle, $22; six cases bicycles and parts, $150.

Alexandria—Six packages bicycles, $80.

Argentine Republic—One case bicycle, $15; two cases velocipedes, $58.

Bremen—Five cases bicycles and material, $130.

British Guiana—Two cases bicycles, $110.

British East Indies—Sixteen cases bicycles, $323.

British West Indies—Thirteen cases bicycles, $428.

British Australia—One hundred forty-eight cases bicycles, $5,624; thirteen cases sporting goods, $429.

China—Eight packages bicycles, $992.

Copenhagen—One hundred forty-two packages bicycles and material, $2,969.

Cologne—One case bicycle, $15.

Cuba—Nine cases sporting goods, $160; thirteen cases bicycles, $590; three cases velocipedes, $68.

Dutch Guiana—Three packages bicycles and parts, $220.

Genoa—Twelve packages bicycles and material, $355.

Havre—Five packages bicycles, $206.

Japan—Ninety-one packages bicycles and parts, $2,947.

Liverpool—Nineteen packages bicycles, $500.

London—Twenty-eight packages bicycles, $522; nineteen packages bicycles and material, $845.

Mexico—One package bicycles, $50.

New Zealand—Seven packages bicycles and material, $284.

Philippines—Eight packages bicycles, $1.000.

Rotterdam—Twenty-two packages bicycles, $383.

Southampton—Forty packages bicycles, $1,175.

St. Petersburg—One package bicycles, $157.

Turin—Six packages bicycles, $275.

Uruguay—Thirty-three packages bicycles, $1,118; two packages velocipedes, $74.

Venezuela—Five packages sporting goods, $29.

Taylor Going Abroad Again

New York, Dec. 22.—Victor Breyer, of Le Velo, the French cycle racing authority and promoter, sailed for home yseterday with a contract with Major Taylor in his pocket. The major has contracted to ride twelve races abroad in May and June preceding the opening of the national circuit in July. He will sail in April so as to get thoroughly acclimated and have the advantage of long preparatory training. He will not ride on Sundays.

Tommy Hall and his six-day mate, McLaren, also sailed yesterday. Hall will return in a few weeks, as soon as he can settle his affairs at home. He has signed a contract with James C. Kennedy, who thinks he has in the popular little Britisher the making of a great pace follower.

All the continental foreigners but Gougoltz, Simar, Fisher and Chevalier, who will compete in the Boston and Philadelphia six-day races, sailed on Wednesday.

The parents of Frank Lentz, the American cyclist who was murdered by the Turks several years ago while he was making a tour of the world, will receive their share of the final distribution of the indemnity fund, amounting to $90,000, paid by Turkey to the United States on account of the destruction of American mission property and the killing of Lentz.

In accordance with an arrangement entered into some time ago the American Bicycle Co. has transferred to the National Battery Co. its place at Lawrence place and Massachusetts avenue, Buffalo. The consideration appears to have been $36,500.

Phoenix, Ariz., has a cycle trade association which has agreed on Sunday closing, the regulation of repair prices and other matters in which all the local dealers are interested. All the local men are reported to have signed.

Arthur P. Carter, of Seymour, Ind., will be in the cycle business on even a larger scale than heretofore next season. He has bought out the cycle department of the Ahlbrand Carriage Co.

The Hussey Novelty Co. has licensed the Canada Cycle & Motor Co., of Toronto, to manufacture and sell Hussey handle bars, under the Canadian patents.

THE AUTOMOBILE FOR HEAVY DUTY

PART THREE.

Comparison of Operating Expenses Taken for One of the Large American Cities Covered by the Adams Express Company's Service.

2-Horse Wagon and 3-Ton Steam Wagon.

2 horses capable of 40 ton miles per day, 300 days:		
Cost of 2 horses ($130), $260.		
Life of horse 6 years, (then worth $30 each) (15%+5%) $30+13	$43	2½%
Wagon cost, $300.		
Last 8 years (12%+5%)	51	3½%
Wagon repairs maintenance	96	6½%
Stabling, maintaining, shoeing, rents, etc., per horse and month, ($30)	720	46%
Driveas pay per annum	600	40%
Cost of harness ($45) last 5 years.		
Per annum including repairs	18	1½%
Per annum	$1,528	100%
3-ton wagon. 120 ton miles net, 300 days:		
Cost of wagon. $2,500.		
25%, interest and depreciation.	$625	35%
Driver	800	40%
Gross weight moves 6½ tons fuel, 8 lbs. of coke per mile. Present market price, $2.70 per caldron	100	7%
Repairs, 10% of cost	250	15%
Stores	50	3%
(The figures relating to "cost, depreciation, and repairs," may seem to be high. The author, however, finds that they can not be much reduced, to serve the purpose of a safe, commercial calculation. On the other hand, cost of water and expenses due to the raising of steam have been left out in the figures. In extreme cases these items might add another 5% to the expense.)		
Per annum	$1,825	100%

2 horses:	
Miles per annum	6,000
Ton miles net	12,000
Cost per mile	25.46 cents
Cost per net ton mile	12.73 cents
4 trips daily, per trip	$1.27
3-ton wagon:	
Miles per annum	12,000
Ton miles net 36,000, gross	78,000
Cost per mile	15.2 cents
Cost per net ton mile 5.06 cents, gross	2.34 cents
8 trips daily, each	$0.76

A comparison between operating expenses of a double and single horse wagon of the Adams Express Company in one of the large American cities shows the following figures:

Cost of operating double wagon monthly:

Two horses	$41.68⅛
Wagon	11.45¼
Harness	5.02⅜
Driver, average	46.05
Conductor	50.00
	$154.21¼

Cost of operating single wagon monthly:

Horse	$ 20.84$_{16}$
Wagon	3 56⅜
Harness	2.84
Driver, average	46.05
Boy, overage	15.80
	$94.10

Cost of operating double wagon would be only 20 to 25 per cent more expensive than operating one-horse wagons; however, a conductor being required to take the place of the boy helper, the cost of operation exceeds that of the single wagon by about 60 per cent, hence it is again seen that considering the high load factor of a single-horse wagon, the two-horse wagon presents more scope for substitution by mechanical means.

Inferences to be drawn from above table. Horses capacity limited, running expenses are biggest, fixed charges smallest.

Steam wagon capacity unlimited, running expenses smallest, fixed charges highest.

Actual propelling of load being, therefore, comparatively cheap, lightness of construction is less important than many people think; in fact, reduction of tare weight below a figure consistent with substantial build, using standard material, calls for expensive construction and increases the above items of "fixed charges" and "repairs" much more rapidly than what it could possibly reduce operating expenses.

For the same reason steam vans may be housed at a great distance from their place of work, any such runs to and from work are cheap, once the boiler is fired up; firing up called for 70 pounds of fuel on a cold December day, while it took only 8 pounds

of fuel per mile to run the wagon; if there were hot water obtainable, such expense could be materially reduced.

Data for a wagon for which there is a great demand.

We find that a wagon capable of carrying a load of 3 tons and able to mount an incline of 1:10 at 2 miles per hour would be very useful.

Internal friction considered, this would call for power to lift about one-sixth (equals an incline of 1:6) of the gross weight a height of 10,560 feet per hour.

Assuming the gross weight to be 6½ tons, we have:

$\frac{6.5\times2,240}{6}\times\frac{10,560}{60}$ foot-pounds per minute.... 427,046 foot pounds.

In other words, to lift the wagon, irrespective of road resistance, we require 12.93 horsepower. To overcome road resistance (tractive effort assumed to be from 60 to 120 pounds per ton) we require:

$60\times6.5\left[\frac{2\times5,280}{60}\right]\left[\frac{1}{33,000}\right]\left[\frac{1}{0.60}\right]$ ..... 3.47 horsepower.

or,

$120\times6.5\left[\frac{2\times5,280}{60}\right]\left[\frac{1}{33,000}\right]\left[\frac{1}{0.60}\right]$ ..... 6.94 horsepower.

The wagon must, therefore, have machinery capable of producing, when going uphill, about a total of 20 horsepower.

Such a wagon should have a boiler of about 100 feet of heating surface exposed to hot gases. Its speed should not be above 6 miles per hour to operate economically. The brakes should enable the driver to stop this wagon when descending the above incline in a distance of about 10 yards.

DEAD WEIGHTS AND CARRYING CAPACITIES OF DIFFERENT WAGONS—(Actual Performances).

SYSTEM.	DEAD WEIGHT, LBS.	USEFUL LOAD CARRIED, LBS.	PER CENT OF DEAD LOAD.	DAILY CAPACITY.
One horse and wagon { horse	1,400	3,000	About 100	18 miles
wagon	1,400			27 net ton miles.
Two horses and wagon { two horses	2,800	4,000	" 66	20 miles.
wagon	3,000			40 net ton miles.
Electric, small delivery wagon	3,000	1,000	" 33	20 miles with one charge battery.
Gasoline, small, delivery wagon	2,000	1,500	" 75	80 miles with one charge fuel.
Gasoline large wagon	4,800	4,000	" 85	
Compressed air on rails	18,000	6,000	" 33	15 miles with one charge.
Two-ton steam wagon	5,400	4,500	" 84	
Three-ton steam wagon	6,700	8,200	" 122	
Four-ton steam wagon	6,500	9,200	" 140	
Wooden freight car	20,000	30,000	" 150	
Steel freight car	39,150	100,000	" 255	

TESTING ENGINE AND GEAR.

The power of a motor wagon should be always measured in foot-pounds at the rim of the driving wheels; for this purpose the drivers may rest on a revolving roller. The latter is in one with a pulley (r) over which a strap is slung, fastened to a dynamometer (d) at one end and carrying a weight (w) at the other end.

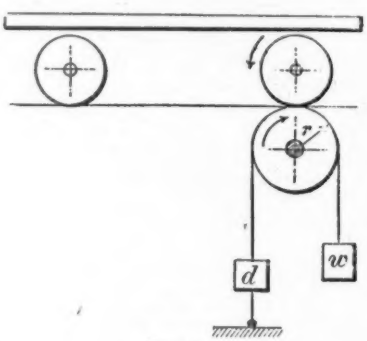


Fig. 3.

The work done at the rim is in foot pounds.

$2\,n\,(r)\times n\times(w-d)$.

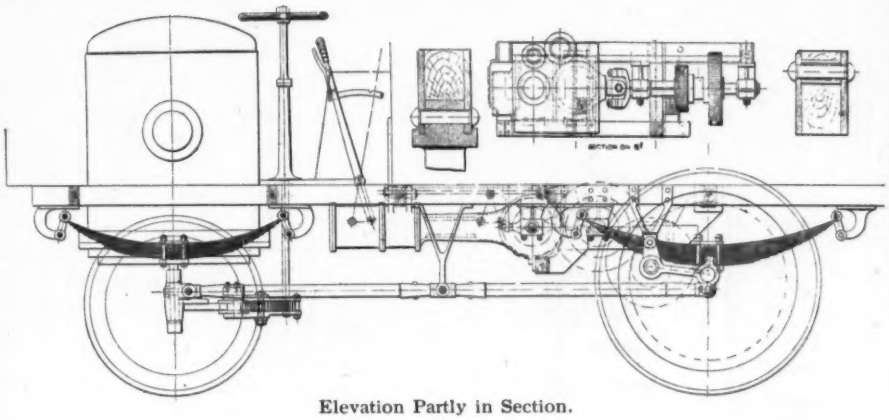
r = radius of pulley.

d = reading of dynamometer in pounds.

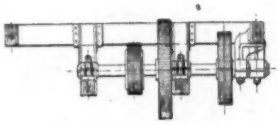
The friction of engine and gearing can thus be found.

TESTING VEHICLE.

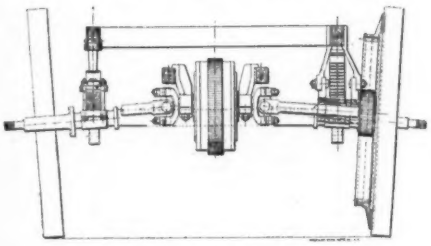
For the purpose of ascertaining the frictional resistance to motion of the wagon



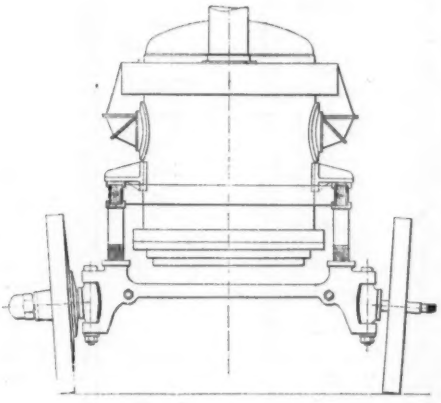
Elevation Partly in Section.



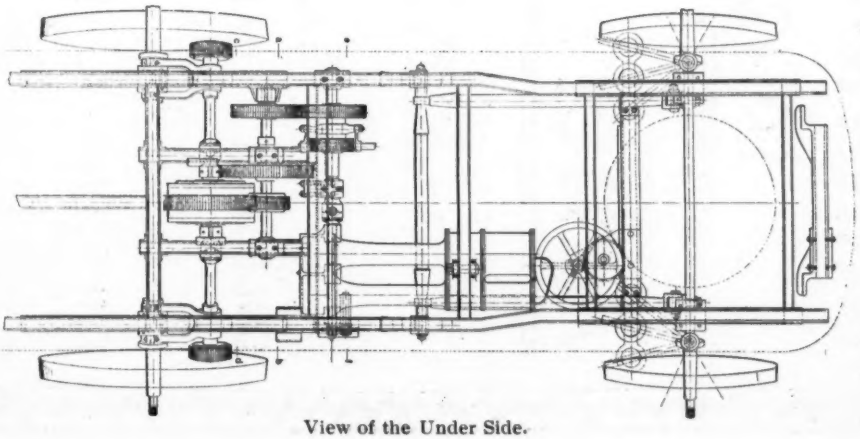
Section on A B.



Section on C D.



Front Elevation.



View of the Under Side.

THE DETAILS OF MR. HERSCHMANN'S WAGON.

1902 ANNOUNCEMENT

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Everything that is new and desirable in Bicycle construction is embodied in our 1902 Models.

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itself, the latter is placed on a measured incline at A, and permitted to roll down and along the level portion of the road BC (see Fig. 4). While passing the point D, between B and C, and a distance of d from A, its speed measures to be v. We have then: W (weight of wagon in pounds).

$\times H$ = foot-pounds, due to gravity work. FWd = friction work in foot-pounds = $WH - \frac{Wv^2}{2g}$, being work due to gravity less the kinetic energy of the wagon in passing the point D. The friction is then found to be in pounds per pound of $WF = \left[H - \frac{v^2}{2g}\right] \cdot \frac{1}{D}$.

Savings Bank on Wheels

For many weeks a story has been going the rounds of the press that an automobile savings bank had been designed in Europe. The details of the plan are furnished by the Paris correspondent of the London Telegraph, who says:

One of the most brilliant ideas of modern times has just occurred to the local authorities which administer the public moneys of the town of Mezieres, in the Ardennes. The new scheme consists of an "automobile savings bank." The term requires some explanation. The inventors applied it to a new sort of motor car which they are having built. The vehicle is propelled by electricity and contains four seats, one in front and apart from the others for the driver. The three places behind are arranged around a revolving table in the middle of the car, one at each side and one at the rear of the vehicle. Writing desks are fitted over each of the three seats and devised in such a way that they can be either folded flat against the sides of the carriage inwardly or opened outwardly. The central table also contains desks, besides book shelves and a small metallic strong box. Such is the new automobile. The use to which the authorities of Mezieres intend to put their invention is as follows:

The car will travel around the country, making stoppages of an hour or so on prearranged days in the different localities of the department. The passengers will be two clerks of the local treasury administration and a cashier. They will carry with them a complete collection of savings bank books, registers and forms, and the third of the above mentioned officials will be empowered to receive moneys. Your readers will have now divined the purpose of the financial authorities of Mezieres. It seems that these gentlemen, assembled in council lately, came to the conclusion that something should be done to encourage thrift among the peasantry of the Ardennes. On the other hand, it was recognized that the saving propensity was already very marked among the country folk.

What was needed was that the administration should meet their wants half way. The peasants put by their earnings thriftily enough, but frequently fail to invest them in savings banks because, especially in the busy summer months, they have little time for journeying to the few principal towns where the offices are situated. So the authorities determined upon sending the savings bank to the country folk instead of waiting any longer for the latter to find time to come to the offices.

The description of the vehicle, which the authorities have built according to their own designs requires no further explanation except to say that the movable desks are intended for use by the public, hence the arrangement by which they can be opened outward over the road. It is reported that the scheme meets with the unqualified approval of the savings bank clerks, whose days hitherto throughout the fine season have been spent in musty offices. But, contrary to what may be expected, the public does not look upon the innovation with unalloyed delight. Some suspicious persons have spread a rumor that the administrative motor car will not always convey savings bank clerks, but will occasionally bring—more often, perhaps, than would be desirable—that unwelcome visitor, the tax collector.

INTERESTING PAPER BY HART O. BERG

CONCLUDED FROM LAST WEEK.

Let me divide gasoline carriages into two types, the carriage and the so-called voiturette.

The carriage type has come to stay. It is almost perfection today, while the voiturette class is still undergoing constant changes. The carriage type or heavier vehicle has been the most successful, as makers could put weight into their carriage, and in order to run at the now desired speeds, weight is what is necessary.

The motors now being used in carriages of this type are so-called slow running, the number of turns per minute, without acceleration, being limited to about 800, and in motors where the stroke is short, the number of turns can be accelerated up to 1,100 and 1,200 a minute without danger of pounding. There has been a gradual cutting down of stroke recently, the diameter of the cylinder and the length of stroke in many instances now being almost square. Almost all the successful motors of today are of a vertical type and are placed in front of the dash. Two cylinders are used almost universally in carriages developing up to 8 H. P., and four cylinders above this. The inlet valves are so arranged as to be easily removed and examined; the exhaust valves being made of a special steel are lifted by cams, and are so arranged as to be readily taken out; the pistons are all fitted with oil grooves; bearings of the crank shaft are large; in fact, all the bearings of the motor are exaggerated in every way, and on this account have long life and are not likely to heat. With a few rare exceptions, two cylinder motors are governed. Governors are usually of the ball type.

The change gear, most popular in France, that is the sliding train, we all agree is not mechanical. But by the experience which has come with the actual working of these change gears, they have been able to develop them into something most practical. Show the ordinary mechanic a gear changing device in which there is a sliding train; he usually throws back his arms and looks with utter horror at this childlike construction. But, gentlemen, they work, they run well, the gears do not strip. I have a carriage here now in which I have run over 10,000 kilometers and in which the gears have never been touched.

The carbureter is so simple that I need hardly refer to same. You all know it well. That which is used almost exclusively today is of the float type and gives very little trouble. Recently the idea of hot tube ignition is being given up. On all of Panhard's new carriages there are no hot tubes; they rely entirely on electric ignition, the various organs of this electric ignition being so perfected at present as to secure entire reliability. There are two distinct methods of electric ignition, one using a primary current, generated in a magneto and being mechanically ruptured in the explosion chamber, and this type has been adopted by Mors and on most of the German carriages.

The other type is the ordinary jump spark, some using vibrators to produce this; others using a simple contact breaker. In every type of carriage the point of ignition can be varied by hand. In some carriages this point of ignition is automatically taken care of. Personally I prefer the hand regulation, although I have run for miles over undulating country without ever thinking of changing the time of ignition.

A method of control has been almost universally adopted in France, and this is entirely regulated, as you know, by the feet. There are two pedals, the left-hand one releasing the clutch while the right-hand one releases the clutch and then brakes. The hands are therefore always free for steering purposes, and as the steering is done with a wheel and is non-reversible, except when very high speeds are obtained, the steering can be done very readily with one hand. The change gear is worked by a lever convenient to the right hand.

And this brings me to a question. Is it better to sit on the right or on the left hand of a carriage? In France the right-hand seat is, with one exception, universal, and I see no reason why they should not

continue to sit on the right; the change gear lever and emergency brake can be manipulated very energetically and more quickly by the right hand, and I do not see why it should be necessary to sit on the left in order to see round the carriage you are passing. We should school ourselves to pass slowly other carriages moving in the same direction at a slow enough speed to avoid accidents.

But little attention has been paid in France to the muffler. People have become accustomed to the puff, puff of the exhaust; horses are no longer frightened, and in muffling the carriage too much, there is some back pressure which naturally detracts from the maximum power of the engine. I have often heard French carriages called noisy. I believe that they can all be muffled down to be as noiseless as can be wished; this, of course, as I have just said, with a slight reduction of the maximum power of the motor.

The oiling devices are now taken care of automatically. When the motor is set in operation, oil is sent to the various parts of the carriage needing it, while grease is forced through tubes under pressure to the several bearings of the carriage needing same.

I have seen in several German carriages automatic oilers relying upon the water pressure made by the circulating pump. Now, sometimes the pump does not work properly. It is just at this time that you need more oil than at other times; therefore, I believe it is a mistake to have one dependent on the other. And while on this subject of pumps, I may tell you that the gear pump is not in great favor in France; the high-speed centrifugal pump run by friction from the flywheel has been adopted almost universally. The flanged radiator seems to give perfect satisfaction, although the Germans have put on some of their carriages the bee-hive radiator, cutting the supply of water down very considerably. But our good French friends argue this way against the bee-hive radiator. Suppose it takes 60 litres of water to cool an engine using a flanged radiator, and only 7 litres to cool an engine where a bee-hive radiator is used. If everything always worked perfectly there could be no question, and the bee-hive radiator, although it costs more, would be preferable; but if there be a small leak somewhere; if one of the joints in the water circulation be bad, it might take three hours for the water to leak out of a 60-litre tank, when same leak in the 7-litre tank would leave the tank dry in less than half an hour. Some day, I have no doubt, the water circulation, pipes, joints, etc., will be so perfected as to allow of the bee-hive or other similar radiator being used.

This type of carriage is usually driven by two chains, the rear axle being solid, the wheels revolving on same. This is simple and gives very good results.

The type of body, of course, changes with local conditions. The recognized tonneau type, however, seems to have found favor everywhere, and is particularly adapted for carriages in which the motors are in front of the dash. I think the tonneau has come to stay.

The second type of gasoline carriage, the voiturette, is still too young to be considered as definite. In these voiturettes the general practice has been to use one motor of the high-speed class; indeed, I have seen carriages with one motor in which the engine turns normally at 1,500 to 1,800 revolutions. This represents a tremendous piston speed, and a consequent wear which to my mind is not practical. In carriages of this type, the speed is controlled entirely by the mixture and advance and delay of point of ignition. Instead of being driven by chains, voiturettes are almost entirely driven by the main shaft direct through beveled gears to the rear axle, which is split.

In other respects the organs of the voiturette are very similar to those of the carriage, but I am fearful that these voiturettes are now built too light, and it does not take very much pounding to knock them to pieces. It has been my experience to find that when a man buys a carriage to seat two people, he invariably wants at the end of a few months to run four people, and it usually happens that the voiturette will not stand such heavy loads.

I have still to say two words about very heavy carriages and lorries in France. Very few large steam lorries have been built. England perhaps has made more advances than any other country in this direction. They are now building trucks there with 4 and 5 tons carrying capacity, but I have

been told by a very competent English automobile engineer that when these lorries are run by private individuals who have one or two in their service, they are more expensive than horses. When, however, more than five are run, and a proper staff organized to take care of them, they can be run cheaper than horses. In Germany there is a very large manufacturer who makes a specialty of gasoline-driven lorries, and the recent trials of some of these lorries at the German, Austrian, and I believe Russian army manœuvers, have given much encouragement, and it is my opinion that this field is a very large one. Your appreciation of same no doubt concurs with mine. The arrangement of the various organs of these gasoline-driven lorries is very much the same as the general French type. Of course, they are much heavier and will stand a lot of knocking about.

It would hardly be fair to the agricultural interests of France if I did not refer to the rapid strides recently made in carriages propelled by the vapor of alcohol. I hardly think that this has any special future here in America, where petroleum is so cheap, but it will be interesting to watch and follow the development of alcohol-propelled vehicles in France.

I know that you will all be glad to learn, those of you who are more moderate in your ideas, that the speed question does not interest people so much now as it did a year or two ago. That carriages should be built with power to carry them uphill at a good rate of speed and through sand and mud, everyone agrees, but this touring through the country at the rate of 60 or 70 kilometers an hour has done much to stimulate legal action against automobilists. Thirty miles (or 50 kilometers) an hour is a very fair speed, and when one can make an average of 25 miles an hour it would seem to me all that can be desired. In order to make this new means of locomotion popular, outside of the more sporty element, one must relieve it of the dangers consequent on excessive speeds. Really, a jolt through the country at from 20 to 25 miles an hour gives one the opportunity of seeing the country and of enjoying the society of one's traveling companions. Perhaps some of you gentlemen present who enjoy the fascination of rushing through space at 40 or 50 miles an hour do not agree with me here, but I am quite sure that when the effect of this exhilaration wears off you will join us, the more rational and slower going chauffeurs. The day of the leather jacket, black trousers and cap has passed in France; people get into their automobiles as they would into their carriage and with just as much certainty of getting to their destination in the time calculated as they would by taking a train.

The Automobile Club of America, of which I have the honor to be a member, by its enterprise and devotion, is emulating its friends of the Automobile Club of France, to whom I must say is due the credit of putting automobiling today in the popular place it holds with everyone. The great popularity of the automobile in France today is not altogether due to the perfection of the French machine, but I must say that great credit must be given to the officers and members of the French club, as they certainly have used all of their energy, time and effort to gain the public approbation for a means of locomotion which, beginning in a sport, finds its own commercial side in its practicability. The officers of the French club have done an immense amount of work in having passed reasonable laws referring to the running of automobiles; they have stimulated the legislation and necessary appropriation for the maintenance of roads; they have encouraged the establishment of modern conveniences and good food in the hotels along the line of communication, which long since had fallen into desuetude consequent on the abandonment of the ancient diligences; they have established intercommunication between countries and made it possible for the touring automobilist to disregard the national frontier. A man can go now from Paris to St. Petersburg or from Berlin to Madrid with but few custom house formalities. They have given to the public an idea of what automobiling really is by successfully managing the several automobile shows which they have organized, each one on a grander scale than its predecessor. I remember but five years ago the automobile show took up but little space in the annual bicycle show. Then, when the Palais d'Industrie was being torn down, they gave a special automobile exposition at the Tuileries. The following

year the space was enlarged almost three times, but it was still under tents in the Tuileries Gardens.

In 1900 they made a fine show at the Exposition Internationale, while later in the year almost three-quarters of the Grand Palais was devoted to a most wonderful exposition, and this year, this week, the opening day of the fourth automobile exposition will be one of the fetes of France. There were to my knowledge over forty applicants for the largest space allotted to any one firm. Even the Grand Palais is now almost too small to show off what the French manufacturers and a few foreign manufacturers have to exhibit.

My object in bringing to your notice the great good to the automobile cause which has been brought about by the Automobile Club of France is to bring nearer to you facts which some of you, not having had the opportunity of seeing for yourselves how successfully this thing has been managed abroad, may not have fully appreciated. Do you fully realize what this American club means to the automobile industry here in America? It is the man who uses the 12, the 16 and the 40-horsepower car who makes the sport popular. Every facility should be given him to get as many of these powerful cars over here as cheaply as possible and as quickly as possible.

We need not be afraid here in America of foreign competition. I want to tell you that our object should be, that our policy is, to take hold of a foreign machine and show the world how it should be built in quantities. The French are inventors; the French are artists; their methods are those employed in the production of small numbers of any one article, no two of which are ever exactly alike. European shop methods do not allow of their undertaking the manufacture of unlimited quantities of any one article on a thorough plan of interchangeability of parts. America and American methods must now take hold in earnest, and I see no reason why we should not become here the world producers of automobiles on a large scale.

The type of vehicle developed by the untiring efforts of the several well-known inventors in France; vehicles the organs of which have given absolute proofs of their fitness; vehicles in which will be contained not one single element of experiment, using in their construction, at least for the present, well tried and perfectly reliable parts, all of which have stood and are standing the hard and long road runs of France.

Now is the time to take hold of this business from a true commercial and manufacturing standpoint, to develop methods of producing a well developed automobile; methods that cannot and shall not be obtained by any other countries of the world. We must stop manufacturing horseless carriages, carriages from which the shafts have been removed, for which the horse has not been taken out of his stable; carriages in which we have tried to hide away connecting rods, pistons, pumps and carbureters; carriages in which the whip socket has been used to hold an induction coil. We must start in manufacturing automobiles, and I feel sure that every effort should be made to induce the bringing into this country at the smallest possible duty carriages which will show the masses what automobiles are.

Do not think me un-American. I am simply looking one step ahead of where the usual manufacturer looks. I believe that the kind of protection that we need is the protection against this sentiment which has been more or less, as far as I can learn, until very recently against the automobile, and this popular sentiment can be changed and cultivated so quickly that in a year or two from now we will laugh at the production of foreign shops.

And let me tell you that 1,000 carriages have never been produced in any one shop in Europe during any one year. Let us get all of the French carriages we can in this country. What can this competition ever amount to for us when we take into consideration what it teaches us, and when we weigh properly in our minds that ever important factor, what time we can save by so doing?

There is a very large and most complete "garage" situated in the very heart of the aristocratic district of Paris. This "garage" has been in existence for 2 years. It contains nothing but American electric carriages. There is another in London, a stone's throw from Picadilly Circus; it consists of seven stories; they are all full of nothing but American electric carriages. I see that in a short while both of these "garages" will have to be added to four, five and tenfold because we shall send over gasoline carriages; we shall beat them by the excellence of our workmanship and the reduced cost of our production. Of this I feel firmly convinced.

STEEL RIMS

CRESCENT AND
DROP CENTER

SECTION

From 1¼ inches up to 4 inches

DIAMETER

From 28 inches up to 5 feet

THE AUTOMOBILE AND CYCLE PARTS CO.
SMITH STAMPINGS FACTORY
MILWAUKEE, WIS.

THE Victor Steam Carriage

Automatic Water Feed.

Steam Air and Steam Water Pumps.

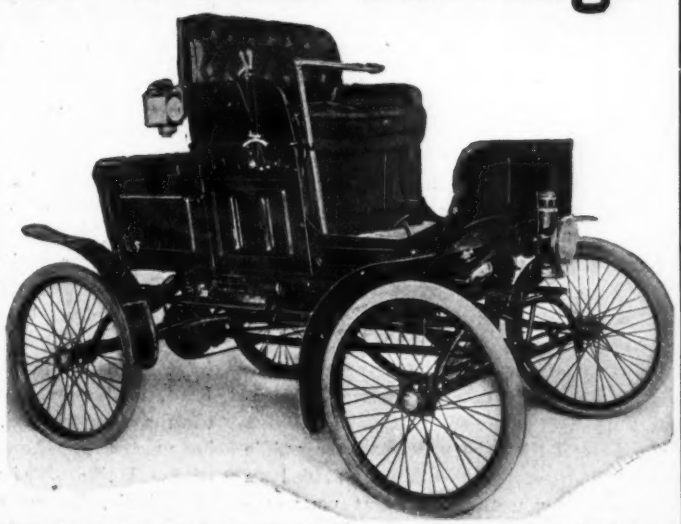
Steel Body.

Feed Water Heater.

Fusible Plug to Cut off Fuel when Water is Low.

Enclosed Engine.

Automatic Throttle Lock.



OVERMAN AUTOMOBILE COMPANY, 81 Fulton Street, NEW YORK
SALESROOM, 31 EAST 32ND STREET, NEW YORK.

MR. DURYEA EXTENDS AN INVITATION

One day last week there arrived at the office of this paper a letter from Charles E. Duryea containing an invitation which, on the spur of the moment, it was difficult to accept or decline. It might have been sent to some of the other papers, too, and maybe they did exactly what this paper did—waited to see what the other fellow had to say about it before committing themselves. At any rate, if the letter, or anything similar, was sent to the other journals they made no use of it. Here is the invitation:

Reading, Pa., Dec. 14.—Editor MOTOR AGE: The public is eagerly seeking and much in need of correct automobile information. It naturally seeks this information from the automobile press. It therefore follows that the information given by the press should, for the best interests of all concerned, be reliable and free from prejudice. While it is not possible for an editor to be a perfect cyclopedia of information, it would seem advisable for him to learn personally facts of interest that he may intelligently and correctly set them before his readers.

We are advocating three-wheeled carriage construction and believe that this question is of sufficient importance to merit the attention of the public and its educators. We believe in and advocate this construction because of its many advantages and think we can convince others of these advantages if given the opportunity. We are probably the only manufacturer in the country having machines, otherwise identical in construction, fitted with three and four wheels. We are therefore the only manufacturer able to make correct comparisons of the two methods. These comparisons we are making continually and convincing many of the superiority of the single steering wheel as compared with the double construction commonly used.

To the end that the press and the public may know these facts we hereby extend an invitation to you to visit us at your convenience and compare for yourself the two systems over the many varieties of roads in this locality; and we will be pleased to offer every assistance that this comparison may be full and complete. If, as we know, the three wheeler is a superior machine, you can readily see the advantage arising to the public from a knowledge of this fact. The propelling power required is less, the handling effort less, the number of parts in a machine fewer, which saves cost, attention and repairs. The tire troubles are less and the interests of automobiling generally will advance more rapidly. If, on the other hand, the three wheeler is not at least equal in service, the public should be advised of this fact so that damage be not done to the industry.

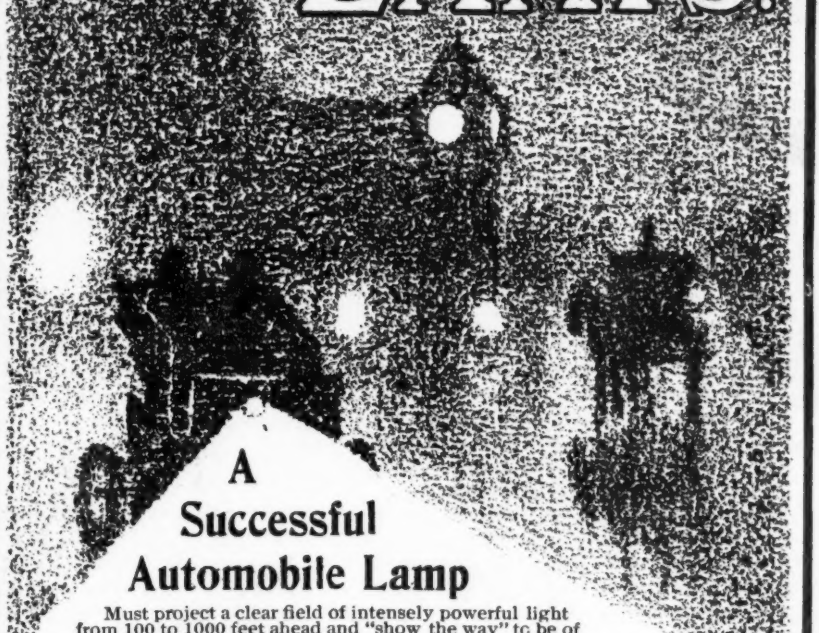
We trust, therefore, you will avail yourself of our invitation in the near future. —Very truly, Duryea Power Co., C. E. Duryea.

Before proceeding further with the matter we desire to have it understood that the columns of this paper are now, as they have always been, and always will be, open to the discussion of matters of interest to the industry. They are open to the discussion of any theories Mr. Duryea may think it wise to advance relative to the superiority of three-wheeled vehicles.

Mr. Duryea's invitation is respectfully but firmly declined, though with thanks for the courtesy which prompted it. The reasons for declining a seemingly fair offer are many, and, we believe, conclusive. Let us reason with ourselves and see where we stand.

At the time of receipt of Mr. Duryea's letter we are of opinion that the four-wheeled vehicle is best. Why? Perhaps because a large majority of the people with whom we associate think so too. Perhaps because we don't know any better. Perhaps because it has been demonstrated to our satisfaction that, in the western country, at least, a three-wheeler is harder to handle than a four-wheeler. Perhaps because we have noted that the greater part of the roads of the United States are similar to those of Illinois, for we are prepared to admit that there are roads in the United States on which a three-wheeler can be operated to advantage, but they are comparatively few.

SOLAR LAMPS.



A Successful Automobile Lamp

Must project a clear field of intensely powerful light from 100 to 1000 feet ahead and "show the way" to be of value in steering.

Must under all conditions stay lighted and burn from six to eight hours per charge

Must be built strongly enough to withstand severe and continual vibration without affecting the lamp or its light.

SOLAR ACETYLENE LAMPS

on account of their patented system of gas generation fill all these requirements. Knowing the truth of this statement, can you **afford to sell your customers experiments?**

Solar Auto-horns or squawkers will prove a money making addition to your line of automobile supplies, for no Chauffeur will be without one in 1902. Prices and electros upon application. Our complete catalogue for 1902 now ready. **BADGER BRASS MFG. CO., Kenosha, Wis.**

And perhaps, too, we are actuated, somewhat, by the belief that the interests of a majority of the people in the trade are our interests. The other side may argue that the interests of the trade lie in the direction of correct construction. That may be true—it certainly is true. But the trade, as a whole, is convinced that four wheeled construction is correct and if it isn't, the proper way to a solution of the problem is by way of evolution, not by revolution.

Now, suppose we were to go down to Mr. Duryea's factory and take along the best talent available to assist in combating his theories. Mr. Duryea is a plausible, persuasive, conscientious man. He is fuller of mechanics than an egg is of meat—or chicken. He has more theories at his finger ends on this subject particularly than an unfortunate newspaper man could combat in 12 months. We, like all the automobile press men, whether they admit it or not, have no license to get into an argument with a man of Mr. Duryea's capacity, especially on his pet theory, unless we are prepared to stay at Reading long enough to demonstrate by the performances of his own vehicles and those of other makers that he is wrong, or that we and all the other makers of the country are wrong. And that would serve no purpose.

In all seriousness, it would be a difficult matter for the cleverest mechanic in America to tackle Mr. Duryea on this theory and prove him wrong. He might, in the course of a long argument, prove his case to some of the more theoretical minds, but to do it to the satisfaction of a majority would be a never-ending task.

It has been said—and one of the eastern papers had a sensible argument on the subject last week, but one which will not be generally followed—that the proper way to succeed in business is to give the public what it wants. This is sometimes a good theory; sometimes bad. But in the case of a disputed point like this three-wheeled theory, when a majority are agreed that four wheels are best, when no one can possibly be charged with fooling the public into a false position, isn't it the part of wisdom to take advantage of the opportunities offered and give the public what it asks for?

Mr. Duryea makes automobiles, as we make a newspaper, for the money there is in it. If he doesn't, he does an injustice to those who are associated with him in business; and he isn't a man of that kind. But he is a man of deep convictions. The writer has known Duryea for nearly 20 years and followed him all through his career in the cycle trade, in which many a man who started long after he did grew rich. He was not fortunate, perhaps, in his business associations, but the fact remains that he did not grow with the business. He pinned his faith to things which wouldn't sell. He devised a spring frame machine which, in theory, was excellent. It was one of the earliest forms of the safety bicycle. But it didn't sell. The people didn't want it. They wanted something like other people had and, theories notwithstanding, Duryea might have been expounding his theories to this day and still people would not have accepted them.

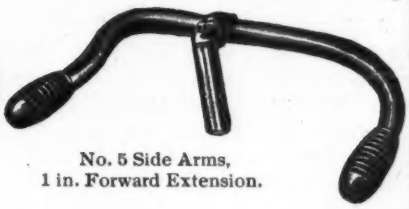
There is hardly a thing we do, a thing we wear, a thing we eat, or a habit we have contracted from association with the other human beings with whom we have been compelled to associate since childhood which has not been repeatedly attacked by some scientist who has been prepared, whenever tackled on the subject, to demonstrate the soundness of his theories. He might, in many cases, prove them correct by actual demonstration. But the people don't want them. They want those things which will give them satisfaction and it may as well be accepted as a fact that they intend to have them—four-wheeled automobiles among the rest.

Mr. Duryea will doubtless continue to sell a number of three-wheeled automobiles each year. Perhaps the owners will be so well satisfied that they will recommend them to their friends, and after a while their friends will buy them too, thus gradually increasing the demand. That is the only way the three-wheeler can be made popular. No demonstration for the benefit of the trade press can cover the point or change the attitude of the public or the makers, unless, perhaps, the proprietors were willing to spend their time and money educating the public. It would therefore seem to be the part of commercial wisdom, in this case, to give the public what it wants, recommending the three-wheeler if you please, but making the best of an excellent opportunity to assume a place among the leaders of what promises to be one of the greatest industries of modern times.

1902 Kelly Adjustable Handle Bars

STANDARD BARS OF THE WORLD

No. 3 Arms, Regular Stem.



No. 5 Side Arms,
1 in. Forward Extension.

No. 4 Racing Arms,
2½ in Forward Extension

It will pay all manufacturers these times when conpetition is hot, to see that their wheels are equipped with just the attachments demanded by the rider. Every rider knows the merits of KELLY BARS, as they have been for the past six years the most popular and foremost sundry in the cycle trade.

The Kelly Handle Bar Co. CLEVELAND, O. U. S. A.

"Toledo"

STEAM CARRIAGES

odel A - - - - - -	$900.00
odel B (Model A with storm top) -	1,00.000
odel C (Surrey) - - - -	1,600.00
odel D (Sloping front) - -	1,100.00
odel E (Model D with storm top) - -	1,200.00
ledo Jr. - - - - -	800.00

Model C.

R. AGENT:

There is one point about a steam vehicle that ust receive attention because of its importance comparing the merits of different forms of mo- e power.

That point is the elasticity of steam as a motive wer.

No one who has driven an automobile long enough be qualified to express an opinion, will allow you underrate this advantage. It is of so much importance an operator that to deride it is to confess ignorance. No her form of motive power can compare to steam in this spect.

The knowledge possessed by an operator of a steam vehicle, at he has at his immediate control any and every degree of wer necessary to accomplish the most severe tasks, is in elf a safeguard and guarantee that gives the operator al- st absolute confidence in both himself and his vehicle.

The hundred and one occasions in an ordinary day's iding when the instantaneous application of your full re- ve power is needed, is too well known to operators of Auto- biles for any one to contradict. It may be that a small boy emnts to cross your path or an over zealous motor man on e trolly car may in his zeal come very near causing an cident, from which only the imediate application of the nderful reserve power of a steam vehicle can save you. In wded city streets, the elasticity of steam will allow you to your vehicle in and out of small openings even before the linary driver has realized your intentions. Many a time in eryday riding, the instantaneous reversing of your operating lever becomes necessary. In the Toledo Steam Carriage your mind takes in at a glance the proper thing to do and without removing either hand from the throttle or steering lever, the machine is driven backward at any degree of speed by the simple backward motion of the same throttle which drives it forward. Nothing could be simpler or easier. With no carriage but the steam driven type is this possible

Send for Toledo catalogue and circular "The Story of a Toledo by Telegraph."

AMERICAN BICYCLE COMPANY

AUTOMOBILE DEPARTMENT

TOLEDO, OHIO.

NEW YORK BRANCH, 91 FIFTH AVENEU

LATE EFFORTS OF DESIGNERS

A French engineer, M. Boulier, has constructed a very unique motor which may be said to comprise three cylinders and six pistons. The illustration shows a section of one of the cylinders and its appurtenances. The cylinders are placed parallel with each other and the explosion chambers are directly over the cylinders. Within the explosion chamber is the admission valve A and the exhaust E. The connection with the cylinder is by the passages C C. The ignition plug is located in the center of the chamber in the upper wall. The admission valve is mechanically operated, as the designer has found that at the extremely high speed of the motor a spring light enough to allow the valve to be opened by the suction in the cylinder will not close the valve quickly enough.

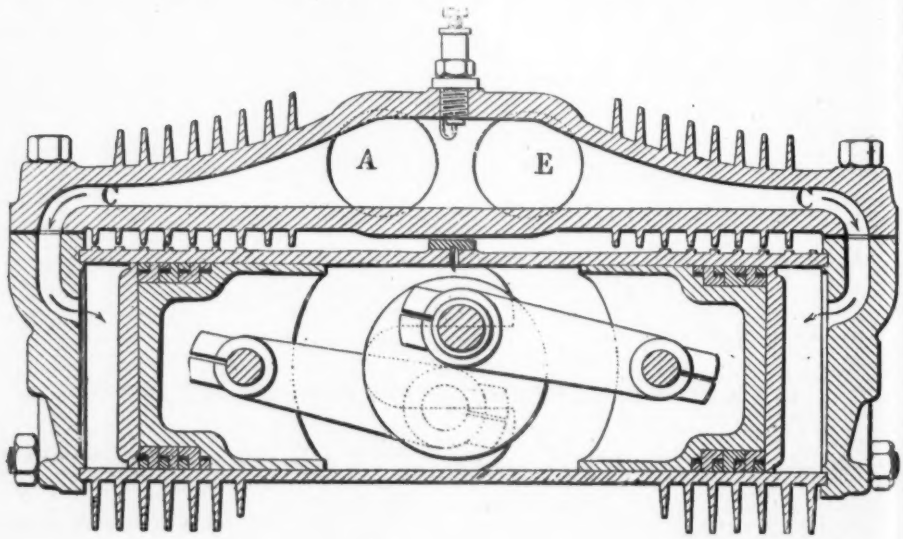
The features claimed by the inventor are that owing to the gases being ignited in the upper chamber they lose a large amount of their heat before passing into the cylinder, which thus cannot become overheated, and it is stated that the motor was run for some hours in the factory without the radiating fins becoming hot enough to burn the bare hand. Owing to the distance from the explosion chamber the pistons do not become heated to anything like the usual temperature and are thus easily lubricated. Another point on which stress is laid is the absence of oil around the spark plug which tends to avoid many of the troubles of ignition. The motor weighs 222 pounds and develops 18 horsepower at 2,000 revolutions per minute.

A Quartz Ignition Tube

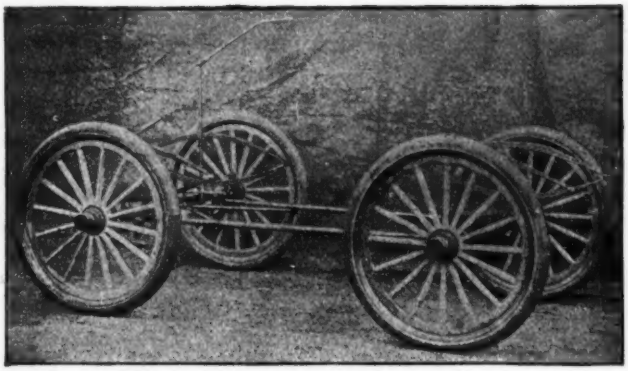
Elihu Thomson, of Swampscott, Mass., has been granted a patent on an ignition tube made of quartz. The quartz is fused at high temperature and when so fused is said to possess certain very desirable qualities. On account of its low coefficient of expansion it will stand to be heated red hot and plunged into water without breaking and will stand extreme temperatures without softening.

Motors for Railroad Service

The introduction of electric motors into railroad service has long been considered, and was successfully applied, for some purposes, by the B. & O. about 3 years ago. The New York Central is said to favor the adoption of electricity in and around New York city, as a result of careful tests. According to the report, the experiments have proved that the change can be made



Automobile Running Gears



Get a running gear that is past the experimental stage and build a SUCCESSFUL AUTOMOBILE

We make two styles complete with springs and wood wheels, solid rubber or pneumatic tires. ∴ ∴ ∴ ∴ ∴

OUR SPRING BLOCK BEARING IS SELF-ADJUSTING

and you ought to have it. It is made for revolving axles and is pivoted between the bearing and spring block, enabling the bearing to move free and easy with the axle always. Our catalogue tells all about it. ∴ ∴ ∴ ∴ ∴ ∴ ∴ ∴ ∴

The Brecht Automobile Co. 1201 Cass Avenue, **St. Louis, Mo.**

The Reputation of the

Gasmobile

Is Justified by Actual Demonstration

It has carried off the honors wherever shown.
Not alone the best by performance but conceded the handsomest, most graceful, easiest controlled and most reliable American built carriage.

First of gasoline vehicles, Merrick Road, March, 1900.
Blue Ribbon—Long Island Endurance Test, April, 1901.
First prize, Guttenburg, N. J., September, 1900.
Winner of every contest for gasoline vehicles at New York and Philadelphia automobile shows. These contests include starting, stopping and obstacle events.
First prize, Newport, September, 1901.
NEW YORK-BUFFALO ENDURANCE RUN—Two first class certificates.
Silver Cup, Providence, October 18, 1901.

AWARDED GOLD MEDAL, PAN-AMERICAN EXPOSITION

Automobile Company of America, 135 Broadway, NEW YORK.

Factory: Marion (Jersey City) N. J.

with advantage, as they have been successful beyond the hopes of the experts at the works of the General Eletric Co. in Schenectady. An experimental car which records the amount of draw-bar pull and the speed under varying conditions was taken to Schenectady from Chicago, and tests secured by propelling it under varying conditions, first with a locomotive and then with an electric motor.

The result, as shown by the comparative readings, was that the electric-motor car showed up very favorably in every way. Its suitability for suburban passenger service, where the runs are short, and where to stop and start quickly are the first considerations, was plainly demonstrated. New York Central authorities state they were so well satisfied with the desirability of substituting electricity for the suburban service around New York that a favorable report would be made to the directors.

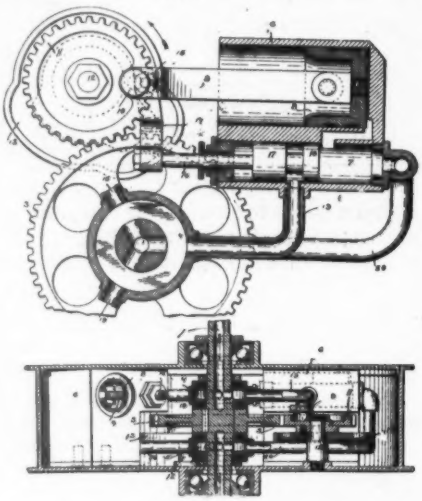
Hub Contained Steam Engine

George W. Cary, of New Bedford, Mass., is the inventor of a hub-contained motor of novel design, which consists of three single-acting steam engines. The construction of the wheel may be of any desired form, but a wire wheel is preferred. A cylindrical case, having annular flanges to which the spokes may be secured, forms the hub of the wheel. The two flat sides of the case are provided with bearing seats. Ball bearings are used with the cones secured to the tubular axle.

The axle is provided with two longitudinal ducts. The steam is conducted to the motor through duct 1 and the exhaust is led from the motor through duct 2. Rigidly secured to the axle is the gear 3 which forms the base from which the wheel is driven. Rotatably seated on the axle is the annular chamber 4. Radially disposed openings in the wall of the axle connect the inlet duct 1 with the chamber 4.

On the opposite side of the gear 3 another annular chamber 5 is rotatably secured to the axle and connects by openings in the axle wall with the exhaust duct 2. The cylinders 6 are secured to the hub casing and rotate with it around the axle. The piston 8 of each of the cylinders is connected by the connecting rod 9 with the wrist pin 10 which projects from the gear 11, journaled on the post 12, which is secured to one of the side plates of the hub casing. The cam 13 is also journaled on the post 12 and is secured to the hub of the gear 11 so as to rotate with the same. The arm 14, whereby the action of the cam is transferred to the valve, is formed to avoid contact with the gear 11 and the central gear 3. On one end of this arm is a roller 15, journaled on a stud secured to the arm. To the other end of the arm is secured the valve rod 16, which actuates the valves 17 and 18 in the valve chamber 7.

The steam supply pipe 19 connects the



annular chamber 4 with the side inlet to the valve chamber and the pipe 20 connects the upper part of the valve chamber with the annular chamber 5. The gears 11 engage with and travel around the gear 3 and carry the hub casing to which their journals are secured around with them, thereby rotating the wheel. The illustrations show a sectional view of the entire hub and a section of one engine.

A Constant Level Vaporizer

Robert and W. T. Aldrich, of Millville, Mass., are manufacturing a vaporizer of the constant level type that is extremely simple and compact, being little larger than the ordinary inlet pipe. The illustration shows an external view and a cross section of the device.

The gasoline enters through the supply pipe, filling the reservoir, and any overflow passes off through the pipe 1. Air is drawn in by the suction of the engine through the

New Kelly Generator

For Steam Vehicles
Improved—Perfect in Every Way

Drip cup unnecessary in starting—Aluminum case over generator—All connections on the outside—Strongly made—Easily adjusted—No flaring or flashing in lighting, even in strong wind. A quick and powerful generator—Main fire valve controlled at seat—Small and neat in appearance and adapted for any machine.

Our new One-Piece Cast Burners have been greatly improved both in power and strength. No wedged tubes in its construction. All in one piece and easily cleaned.

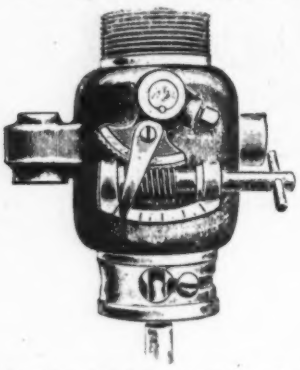
Address, KELLY HANDLE BAR CO., Cleveland, Ohio, U. S. A.

WANT ANY **Catalogues?**

Tell us whose they are and we will send them to you if the maker is among our advertisers.
We save you the trouble of writing a number of letters.
We place the maker promptly in touch with buyers.
Send stamps to defray postage.

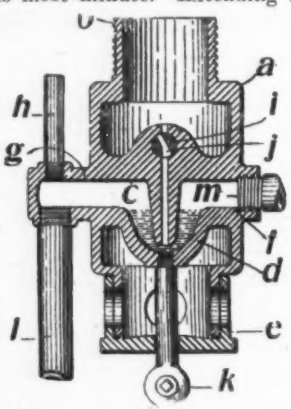
THE MOTOR AGE
MONON BUILDING
CHICAGO, ILL.

openings, which are regulated in size by the cap e. Passing around the chamber d it produces a draft which draws the gasoline from the reservoir through the nipple e and the valve i, which is counterbored at j. Passing upward the mixture of gasoline and air leaves the vaporizer through the pipe b,



which is threaded for connection to the inlet pipe of the engine. The vent h maintains a constant pressure in the reservoir. The gasoline in the reservoir may be drawn off through the drain cock k.

The valve i is controlled by a toothed segment and a worm, whereby the adjustment is most minute. Extending from the



segment is a pointer which moves over a scale and shows the position of the valve. The device has several meritorious features, notably the location of the gasoline feed in the center of the air passage and the minute adjustment of the feed, as well as the general simplicity and compactness.

Buffalo Mobile & Auto-Bi Co.

The well-known Auto-Bi Co. of Buffalo, successor to the motor bicycle business of the E. R. Thomas Motor Co., has added two lines of automobiles and will be known in future as the Buffalo Mobile & Auto-Bi Co. It will market its product entirely through agencies and its policy will be liberal to legitimate dealers. The 1902 models will consist of a motor bicycle, equipped with a 1½ horsepower motor and one equipped with a 2 horsepower motor.

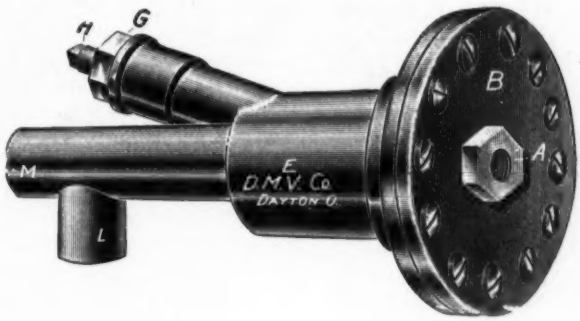
The company will market two lines of automobiles, to be sold at $600 and $750 respectively. One will weigh about 400 pounds, equipped with water cooled 3½ horsepower motor and be named Buffalo model 6; the other will be equipped with a 6 horsepower water cooled, medium speed motor and weigh about 600 pounds and will be known as Buffalo model 7

Dayton Automatic Gasoline Regulator

An automatic regulator that can be depended upon to maintain a uniform boiler pressure, should be regarded as an indispensable article in the equipment of a steam carriage. Provision can easily be made for cutting it out, if for any reason the operator desires, temporarily, to controle the fire by hand, but for all ordinary use, the automatic regulator should be used, provided its construction is such that it can be depended upon. One of the weak points developed by experience is the packing gland through which the valve stem passes. To prevent leakage of gasoline, this packing gland has to be packed very tight, which, together with the heat, which dries the packing, causes the valve stem to stick and renders the regulator either inoperative or unreliable.

This objectionable feature, the makers believe, is entirely eliminated in the new Dayton regulator. No packing is used, consequently the movement of the valve stem is always free, and a much larger stem can be used, thus insuring more accurate seating of the valve, and against springing. Another valuable feature is that the entire head B unscrews from the body E thus giving easy and quick access to the spring and valve stem without disturbing the diaphragm, which is enclosed between the two discs constituting the head B and which are fastened together by screws as clearly shown. Steam connection with boiler is made at A. The head B is composed of two discs fastened together with screws and between which is placed the metal diaghragm

that communicates movement to the valve stem. In the body of the regulator E is placed a steel compression spring which is set up to the desired pressure by the stem H and lock nut G. The gasoline or other liquid or gaseous fuel used for generating steam, passes into the regulator at M and is discharged at L or vice versa, both M and L being threaded to receive standard pipe connections. When the desired boiler pressure is exceeded the steam acting upon the diaphragm closes a needle valve and cuts off the supply of fuel, and as quick as the steam pressure falls below the desired point, the compression spring opens the needle valve and turns on the fuel.



This regulator is guaranteed to regulate accurately and continuously, and can readily be substituted for regulators now in use and which may not be entirely satisfactory. The Dayton Motor Vehicle Co., Dayton, O., is the manufacturer.

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For Kerosene.

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Sept 16, 1901

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Yours respectfully.
Donald M. Powers.

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37 Laight St., N. Y. Established 1840.

THE INDUSTRY IN GERMANY

That the conditions surrounding the early stages of the industry in Germany are quite similar to those in America, is indicated in an article in FahRad Export, which says: "A few years ago manufacturers in the cycle industry rushed into building automobiles. They expected to win their laurels by storm, every manufacturer exerting himself to the utmost to put something out of the common on the market, which he regarded as virgin soil. Everyone invented and everyone was convinced of doing his level best and was confident of bearing off the palm in the face of his competitors by virtue of some peculiar idea. This would have been all very well, and, no doubt, much of value would have resulted from this feverish and seething state of things, had everyone rested satisfied in doing his best in the field where he was at home, where long experience and a well drilled working force combined to insure success from the very beginning in constructing carriage frames. But most of such people were not satisfied with this modest work, which was not appetizing enough. The machine itself, the automobile motor, had to be invented and built in their own works. Of course, experience was lacking, but inventors were glib-tongued and, confident of victory, not slow to press their claims and all such people said was so plausible, so simple, so natural, that success must follow. Then work was begun. The machine was built and was even put in operation, but then doubts began to crop out, which were not easily banished. Money was used up, the old established business began to suffer and the new machine, the star of promise, upon which such sanguine hopes had been founded, began to wane; in short the machine did not come up to expectations. Then hard work began, every nerve being strained to carry out the work once begun, so as not to become the laughing stock of rival firms and manufacturers and, last but not least, the enormous sums which had already been invested in the undertaking, should the money have been spent in vain. Experiment after experiment was made, but in vain, the unavoidable standstill came, faint-heartedness ensued, buyers became alarmed, money had been fruitlessly sunk and such persons cursed the day they had gone into such an undertaking.

"In the meantime other persons had gone into automobile building, firms not belonging to the cycle industry, but machine builders, who were well versed in motor building, but knew nothing about carriage building. Such firms came to the front, the machines worked satisfactorily, but the less said about the carriages the better. Such vehicles, however, found purchasers and the public at large began to think there was a chance of the development of the automobile assuming a tangible shape; there being only one objection, namely the general external appearance of such vehicles. If it were only possible to devise a pretty and more pleasing form for such vehicles, interest in which, however, did not abate, but rather increased on foreign makers showing us how horseless vehicles could be imparted a pleasing exterior and form. A new period of onward striving and progress began. Manufacturers of vehicles, who had as yet not entered the new field of competition, found the right way to go to work. Buying of those who had paid for their ventures by bitter losses and profiting by the experience of such persons, the result being that these new firms, or at least new in this particular field of manufacture, turned out a good article, building also the vehicles themselves. Unfortunately, it became necessary to look abroad for getting proper machines, which were so modeled as to meet all practical needs. Foreign firms were, however, not long allowed to keep the lead thus gained, as in our own land the field of working has been weeded out and a new industry has taken root and sprung up on an industry based in general on the experience gained from gas-motor building and profiting by automobile motor building in particular and which is centering its energies upon the manufacture of motors for horseless vehicles.

"We are now profiting by the mistakes made in the past and may well go on with fresh courage, in the way now entered upon. Cycle manufacturers who have survived the hard times and hard blows dealt them, can confidently, and with every hope of success, turn their hands to automobile building, as a good machine can be bought for little money and all directions given for putting in the motor. In the building of carriage frames, however, our constructors are not going to be outdone by foreign competitors, who, as a result of the race between Paris and Berlin, have pocketed millions, but relying on experience gained will go hand in hand with car and carriage builders to prove to our foreign rivals that German industry is not inclined to be left behind in the race, but intends, on the contrary, to take and keep the lead. In addition to the building of private carriages, the making of light and heavy business wagons will be found to be lucrative, among such, also vehicles, which by changing the body can easily and speedily be converted into a light private carriage."

The Handsomest Calendar

Of the season, in ten colors, six beautiful heads, in six sheets, 10x12 inches, reproductions of paintings by Moran, issued by general passenger department, Chicago, Milwaukee & St. Paul Railway, will be sent on receipt of twenty-five cents. Address F. A. Miller, General Passenger Agent, Chicago.

E. T. Harris, 531-545 West 15th street, Chicago, has recently issued a neat catalogue illustrating an interesting line of hubs, hexagon nuts, axles, cones and washers, instantaneous adjustment repair cones, sprocket blanks, seatpost bolts and vehicle hubs. These goods have steadily been growing in popular favor. Mr. Harris is putting out this season a compartment case, containing an assortment of 100 repair cones adjustable to fit any hub, without extra charge for the case. A full stock of these goods is carried by D. P. Harris, 101 Reade street, New York, for accommodation of eastern jobbers.

The property of the Twin Towns Mfg. Co., of Luke, Md., which expected to make atuomobiles, has been ordered sold by a receiver.

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Avery, F. E., Columbus, O.
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Atherton, J. L., Scranton, Pa.
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Ayres, M. O., Dakota City, Neb.
Allen, Chester, Kenosha, Wis.
Alexander, Dr. Harrison, Manchester, N. H.
Adams, A. L., 45 Salem street, Worcester, Mass.
Allen, Marcus C., Glens Falls, N. Y.
Allen, George A., Spencer, Mass.
Allen, Dr. G. M., Auburn avenue, Mt. Vernon, O.
Andrus, Frank, Lincoln, Neb.
Akers, Mr., furniture dealer, Decatur, Ill.
Adams, E. C., Battle Creek, Mich.

Bloch, M. G., Toledo, O.
Bair, C. C., Tiffin, O.
Bahronburg, Dr. William, Belleville, Ill.
Burtless, H. E., Toledo, O.
Brown, Wm., Stonecreek, O.
Bundy Bros., New Castle, Ind.
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Burg, Eddie, Burlington, Ia.
Baylor, Dr. John G., Montpelier, Vt.
Barnes, Dr. F. M., Middletown, N. Y.
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Beacon, Frank W., maker, Omaha, Neb.
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Burkholder, Frank, Wooster, O.
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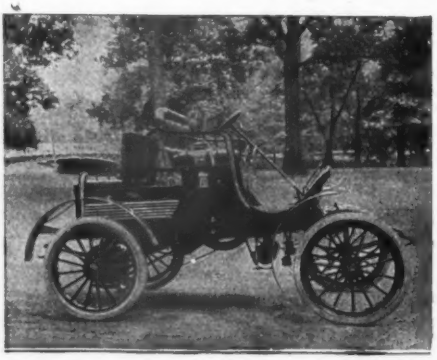

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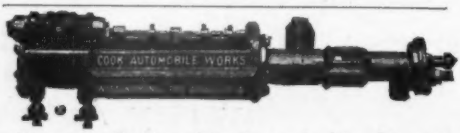

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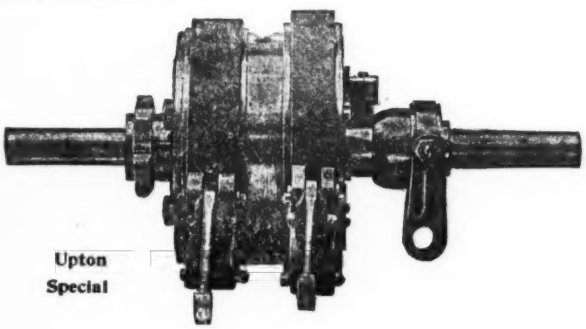

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